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Carbon Monoxide Hot Spot Guidelines Volume V: User's Manual for Intersection-Midblock Model

GCA Corp, Bedford, MA GCA Technology Div

Prepared for

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This manual documents version 2 of the IMM (IMM-2). The principal changes from version 1 is the incorporation of the Motor Vehicle Emission Factors released in 1978 and the Modal Analysis Model coefficients and deterioration released in late 1977. Otherwise IMM-2 is substantially the same as the first version written by Victor Corbin and Michael T. Mills.

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Carbon Monoxide Hot Spot Guidelines
Volume V: User's Manual for Intersection-Midblock Model

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Prepared for

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Research Triangle Park, North Carolina 27711

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As an aid to the identification and analysis of carbon monoxide hot spot locations the Intersection-Midblock Model (IMM) has been developed for the calculation of hourly carbon monoxide concentrations at user specified locations near streets or intersections. The IMM calculates carbon monoxide emissions due to vehicle cruising, acceleration-deceleration and idling by use of the EPA Modal Analysis Model. These emissions are then assigned to traffic links or portions of links based upon calculated intersection parameters such as cycle time, green time, queue length and delay time. After the emissions have been calculated and distributed among the individual lanes of each link, the EPA HIWAY Model is called to calculate carbon monoxide concentrations at each receptor location based upon input values of hourly wind speed, wind direction and atmospheric stability. If the street-building configuration, the wind speed and the atmospheric stability is such that a street canyon vortex will develop, the "Street Canyon Model" is used to calculate the concentration of a street oriented receptor.

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PREFACE

This document is the fifth in a series comprising the Carbon Monoxide Hot Spot Guidelines. The purpose of this series is to provide state and local agencies with a relatively simple yet accurate procedure for assessing carbon monoxide hot spot potential on urban street networks. Included in the Hot Spot Guideline series are:

Volume I:	Techniques
Volume II:	Rationale
Volume III:	Summary Workbook
Volume IV:	Documentation of Computer Programs to Generate Volume I Curves and Tables
Volume V:	Intersection-Midblock Model User's Manual
Volume VI:	Modified ISMAP User's Manual
Volume VII:	Example Applications at Waltham/Providence/Washington, D.C.

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We wish to acknowledge the significant contributions made early in the development of the Intersection-Midblock Model by previous GCA/Technology Division staff members, including Dr. Robert Patterson, Dr. Michael Mills, and Mr. Victor Corbin. We are also indebted to the EPA Project Officer, Mr. George J. Schewe and to Ms. Nancy Mayer of the Source Receptor Analysis Branch, who performed extensive technical and editorial review of the final reports and computer programs. We are especially grateful to the computer assistance of Mr. Erik Sieurin also of the Source Receptor Analysis Branch.

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SECTION 1

DESCRIPTION OF THE MODEL

INTRODUCTION

This manual describes the first of two computer programs developed by GCA/Technology Division for the analysis of carbon monoxide hot spots. The calculations performed by the Intersection-Midblock Model (IMM) are virtually identical to those used to generate the nomographs presented in the Carbon Monoxide Hot Spot Guidelines, Volumes I and II. While this model is not intended to replace these guidelines, it does provide added flexibility in carrying out the analysis. In the first place, it will enable the user to carry out hot spot screening and verification for a large number of receptor locations not necessarily identical to those assumed in the guidelines. The model can be used to calculate carbon monoxide concentrations at actual monitoring locations for comparison with measured values.

In the another manual of this series, Volume 6, a modified version of the Stanford Research Institute ISMAP Model (Indirect Source Model for Air Pollution)[3] is introduced and documented. This model extends the analysis procedures used in IMM to a large number of intersections, provides for left and right turning traffic and allows traffic volumes to be generated within the link network in response to trip attractions and productions within various traffic zones.

The IMM was developed for use on an IBM 370/158 computer but has also been successfully tested on the UNIVAC 1110 computer at Research Triangle Park, North Carolina and should run on other computer facilities with little or no modifications to the code. Job control language requirements for the IMM are quite simple in that only card input and line printer output are required in addition to a FORTRAN compilation step. Unit numbers are easily modified within the program to provide input from tape or disk.

The remainder of this section contains a discussion of the model formulation and presents some of the more important equations used in the program. A detailed listing and discussion of the program input cards is given in Section 2 followed in Section 3 by a description of each subroutine found in the program. A discussion of the format of the output is in Section 4. Section 5 contains a discussion of the steps required to use the APRAC Model for calculation of background at the model receptor locations. A program listing, flow charts and input-output for a sample case are given in Appendices A, B and C, respectively.

MODEL FORMULATION

Overview

The IMM is designed to estimate the impact of automobile traffic upon carbon monoxide concentrations at selected receptor locations. It is a combination of state-of-the-art emissions calculations (Modal Model),[4] dispersion modeling (HIWAY)[5] and the determination of signal cycle times, delays and queue lengths through application of traffic engineering principles. The model is able to handle receptors located near intersections, at midblock locations and along street canyons. In Figure 1 we present a generalized flow chart of the IMM. Complete flow charts for the main program and subroutines are given in Appendix B. The first part of IMM is devoted to the calculation of average queue lengths and delay times based upon input signalization characteristics, lane volumes and lane capacities. The queue length and delay times together with input cruise speeds, accelerations and decelerations are used by the Modal Model for calculation of cruise and excess emissions. These emissions are then corrected for vehicle population characteristics and assigned to traffic links as line source emission rates, which along with receptor locations and meteorological data are input to a dispersion model for calculation of hourly carbon monoxide concentrations.

The intersection serves as the primary focus for model input and intermediate calculations. As the model now stands, it has the capability of handling a network of up to two intersections, but that number may be easily increased by modification of the appropriate DIMENSION statements. Each intersection is currently restricted to having two signal phases. Although the number of allowable phases may be increased by changing the applicable DIMENSION and READ statements this action would only have the effect of allowing more than four links to approach an intersection since left turning phases are not explicitly treated within the program. In any case, for each of the two phases per intersection currently allowed in the program there are two intersection approaches.

Each combination of intersection, phase and approach uniquely defines a link approaching an intersection. In IMM a link is directional; consequently, a two-way street consists of two links. Input parameters for each of these links include traffic volume (vehicles/hour) for the link as a whole, west to east and south to north coordinates (km) of the endpoints of the link center lines, effective emission height (m) for the link, width of the link (m), number of lanes for the link (one, two or four), cruise speed on the link (mi/hr), deceleration into the queue (mi/hr/sec) (must be input as a negative acceleration), and acceleration out of the queue (mi/hr/sec). The link centerline endpoints need not be numbered in any particular order since the coordinates of the approximate center of the intersection (a set of variables input earlier) serve to fix the orientation of the link. An option is provided for consideration of the link as a cut section of a specified width (m). The fractional portion of the link emissions assigned to each lane is also input to the program, and used to input into the dispersion submodel; however, the volume of traffic per link used in the calculation of cycle time, green time, delay and queue length is calculated within the program simply by dividing

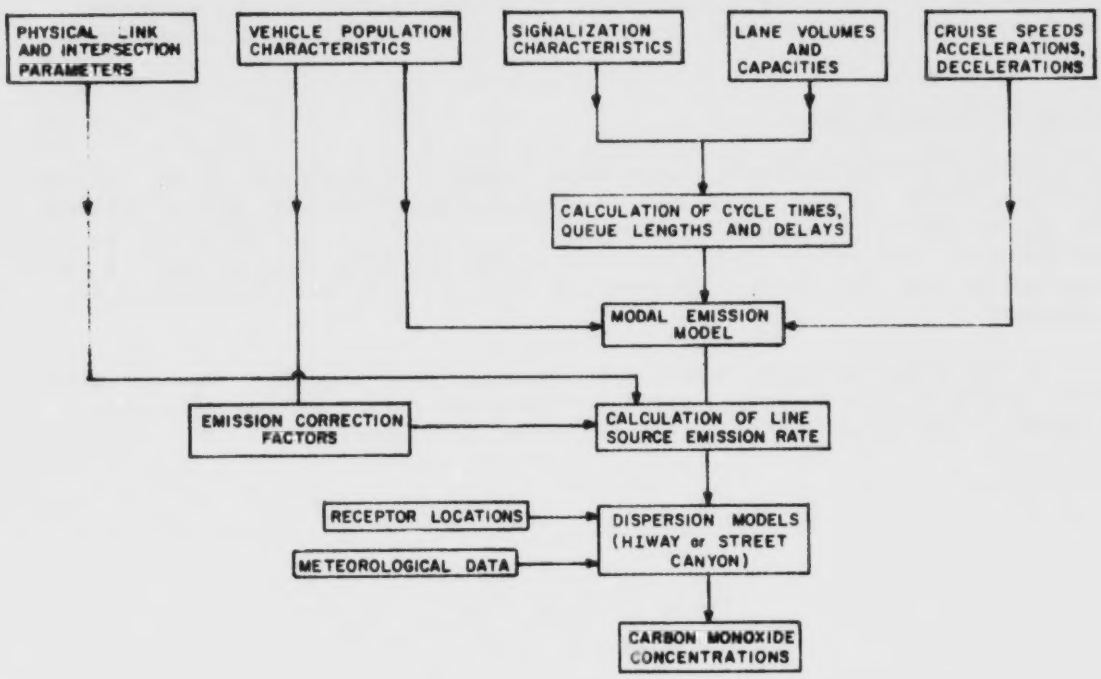

Figure 1. General flow diagram for the IMM.

the total link volume by the number of lanes. For specifying the fractional emissions for each lane within a link, the order of the lanes is from left to right when looking along the link from the first specified endpoint to the second. Finally, an hourly adjustment of the volume on all links is also input to the program.

Parameters for those links not approaching an intersection are input after all the data pertaining to the links that do approach an intersection are read into the program. The same parameters are input for these links except for the accelerations into and out of the queue. Also, only a single vehicle speed is specified. For these links the queue lengths and delay times are set equal to zero by the program. In setting up the coordinates for these two different types of links, the links approaching an intersection should terminate at the intersection stop line while the link not approaching the intersection (leaving the intersection) should originate at the terminus of the first link to ensure that the emissions from the actual intersection are realistic.

Emissions Calculations

After the link parameters have been input, the emissions for the three different modes (cruise, idle and acceleration-deceleration) are calculated. The cruise and acceleration-deceleration emissions are calculated by use of the EPA Modal Analysis Model,[4] parts of which have been incorporated as subroutines in the IMM. Idle emissions are calculated by use of the MOBILE1 program.[11]

In the Modal Analysis Model, instantaneous emission rate, $\dot{e}_A$ (g/vehicle/sec), during deceleration and acceleration modes is a function of speed, v (mi/hr), and acceleration or deceleration, a (mi/hr/sec):

$$\dot{e}_A\ (v,a) = b_1 + b_2 v + b_3 a + b_4 av + b_5 v^2 + b_6 a^2 + b_7 v^2 a + b_8 a^2 v + b_9{}^2 a^2 \qquad (1)$$

During cruise mode it is a function of speed only:

$$\dot{e}_s\ (v,o) = b_{10} + b_{11} v + b_{12} v^2 \qquad (2)$$

The modal emissions calculation is also designed to reflect a user-specified vehicle age mix. The effect of the vehicle age mix is to change the b_i coefficients of Equations (1) and (2).

The total acceleration-deceleration emissions per vehicle, E_{AD} (g/vehicle), corrected for the cruise emissions that would have occurred had the vehicle not stopped are:

$$E_{AD} = \int_{o}^{T_{IN}} \dot{e}_A\,(v_I(t),\ a_{IN})\ dt + \int_{o}^{T_{OUT}} \dot{e}_A\,(v_O(t),\ a_{OUT})\ dt \qquad (3)$$

$$- \int_{o}^{T_{IN/2}} \dot{e}_s\,(v_I(t),\ o)\ dt - \int_{o}^{T_{OUT/2}} \dot{e}_s\,(v_O(t),\ o)\ dt$$

The variables, T_{IN} and T_{OUT}, are the times spent decelerating and accelerating, respectively, and are given by:

$$T_{IN} = \frac{V_{IN}}{-a_{IN}} \qquad (4)$$

$$T_{OUT} = \frac{V_{OUT}}{a_{OUT}} \qquad (5)$$

where V_{IN} = speed into the queue (mi/hr)

V_{OUT} = speed out of the queue (mi/hr)

a_{IN} = acceleration into the queue (mi/hr/sec) (must be negative to correspond to a deceleration)

a_{OUT} = acceleration out of the queue (mi/hr/sec) (must be positive)

The speed functions for deceleration, $v_I(t)$, and acceleration, $v_O(t)$, are given by:

$$v_I(t) = v_{IN} + a_{IN}t \qquad (6)$$

$$v_O(t) = a_{OUT}\ t \qquad (7)$$

Traffic Calculations

Once the cruise, idling and acceleration-deceleration emissions rates have been determined, the traffic calculations are carried out.* If the "free flow" program option has been specified by the user, no traffic calculations are performed and cruise emissions are assumed everywhere. If the signal for a particular intersection is fixed time, then the green time, G, and the cycle time, Cy, are specified by the user. For a demand actuated signal, IMM uses the following formula for Cy (sec):

$$Cy = \frac{(9\ Np + 5)}{1 - \sum_{\text{all } j} \text{Max}_i\ (V_{i,j}/Cs_{i,j})} \qquad (8)$$

where Np is the number of amber intervals per signal cycle during which there is no simultaneous green phase, assumed to equal 2;

9 is a weighted lost time factor which assumes 3 seconds of amber time and 3 seconds of startup time;

$V_{i,j}$ is the volume in the ith approach that moves during the jth signal green phase;

$Cs_{i,j}$ is the capacity per hour of green to vehicles on the ith approach moving during the jth signal phase, assumed to be 1,800 vehicles per hour of green.

The green phase length, G_j, is a fraction of the signal cycle time minus the total amber time. A 3-second amber time is assumed for all green phases. The green phase length (sec) of phase j is calculated by the following equation:

$$G_j = Cy \frac{\text{Max}_i\ (V_{i,j}/Cs_{i,j})}{\sum_{\text{all } j} \text{Max}_i\ (V_{i,j}/Cs_{i,j})} - 3 \qquad (9)$$

where $\text{Max}_i\ (V_{i,j}/Cs_{i,j})$ is the maximum V/Cs ratio on all approaches i moving on green phase j;

3 is an assumed 3-second amber time;

---

* The users should consult Volumes I and II for the Carbon Monoxide Hot Spot Guidelines for a more detailed discussion of the following formulae.

$\sum_{\text{all } i} \text{Max}\,(V_{i,j}/Cs_{i,j})$ is the sum of the V/Cs ratios that control the green phase durations.

The approach capacity, C_i, is found by multiplying the approach capacity service volume by the appropriate green to cycle ratio and summing for all applicable phases. The capacity of an approach is calculated as follows:

$$C_i = \sum_j Cs_{i,j}\, G_j/Cy \tag{10}$$

The proportion $P_{i,j}$ of vehicles which stop on phase j and approach i of the intersection is given by:

$$P_{i,j} = \frac{1 - \frac{G_j}{Cy}}{1 - \frac{V_{i,j}}{Cs_{i,j}}} \tag{11}$$

The number, $N_{i,j}$, of vehicles that must stop is then:

$$N_{i,j} = \frac{P_{i,j}\, V_{i,j}\, Cy}{3600} + \frac{V_{i,j}}{C_i - V_{i,j}} \tag{12}$$

The second term becomes important only as volume approaches capacity. It provides a measure of the "residue" of vehicles that may require more than one signal cycle to clear the intersection. The queue length, $Lq_{i,j}$, is calculated as:

$$Lq_{i,j} = 8N_{i,j} \tag{13}$$

where 8 is the distance in meters occupied by a queued vehicle. Finally, the idle delay time, $R_{qi,j}$ (sec), is calculated by:

$$R_{qi,j} = 0.5\, P_{i,j}\, (Cy - G_j) + \frac{3600\, V_{i,j}}{C_i(C_i - V_{i,j})} \tag{14}$$

At unsignalized intersections, the number of queued vehicles, $N_{i,2}$, is calculated simply by:

$$N_{i,2} = \frac{V_{i,2}}{C_i - V_{i,2}} \tag{15}$$

In the traffic calculations for the unsignalized intersection, queue length and delay time for the major street (j = 1) are assumed to be zero so that queues and traffic delays occur only on the minor street which is controlled by a stop sign. This distinction between the major and minor streets for an unsignalized intersection must be recognized when specifying link numbers and reading in link parameters.

The queue length for the minor street is calculated using Equation (13) and the idle time is:

$$R_{qi,2} = \frac{3600\ N_{i,2}}{C_i} \tag{16}$$

The calculation of approach capacity, C_i, for an unsignalized intersection differs from that of a signalized intersection. It is a function of the traffic flow on the cross street and the time gap between cross street vehicles that is acceptable to a driver wanting to cross or turn onto the cross street. In this case C_i is calculated from:

$$C_i = \frac{(V_m + V_n)\ e^{-T\ \frac{(V_m + V_n)}{3600}}}{1 - e^{-T\ \frac{(V_m + V_n)}{3600}}} \tag{17}$$

where V_m = volume on one direction of the major street (vehicles/hr);

V_n = volume on the other direction of the major street (vehicles/hr);

T = gap acceptance between cross street vehicles (sec)(assumed to be 4 seconds for the development of the guidelines but still classified as a model input parameter).

Based upon the traffic calculations just described, queue lengths are assigned to all links except those not approaching an intersection and those approaching unsignalized intersections. Corresponding to these queue lengths another set of links ("pseudolinks") are constructed. These pseudolinks lie along the actual link, have the same termination point (at the intersection end of the link) for their centerlines as the actual link and have a length

equal to the calculated queue length. The only type of emissions assigned to the physical links are the cruise emissions E_c (g/m/sec) is calculated by:

$$E_c = \frac{\dot{e}_s \; V/3600}{v \; 1609.344/3600} \qquad (18)$$

where $\dot{e}_s$ = cruise emission rate for vehicle speed v given by Equation (2) (g/vehicle/sec)

V = link volume (vehicles/hr)

v = vehicle speed (mi/hr)

1609.344 = number of meters in a mile

3600 = number of seconds in an hour.

In Equation (18) the subscripts (i,j) have been dropped for simplicity. It should also be noted that emissions from both links and pseudolinks are allocated to the individual lanes of the link according to the fractional breakdown specified by the model input. The pseudolink emission rate, E_p (g/m/sec), is given by the following expression:*

$$E_p = \left[\frac{E_{AD} \; N}{Cy} + \frac{E_{ID} \; R_q \; V}{3600} - \frac{(\dot{e}_s) \; (T_{IN} + T_{OUT}) \; N}{Cy} \right] / Lq \qquad (19)$$

EMISSION CORRECTION

Since the emissions obtained from the Modal Analysis Model correspond to 1977 emission rates for light-duty vehicles, corrections must be made to account for the actual calendar year emission rates and the effects of vehicle mix, temperature, altitude, percent cold-start operation, percent hot-start operation, and state (California or other).

The MOBILE1[11] program is used to calculate correction factors to accomplish this correction. Since the MOBILE1 program is well described elsewhere, it is not presented here. The MOBILE1 program was modified to allow the correction of idle emissions; this modification is described in Volume IV of the Hot Spot Guidelines. The idle, cruise, deceleration, and acceleration emissions are calculated according to the following equations:

*If the acceleration deceleration emissions (i.e., the first term of equation 19) are greater than the idle emissions (i.e., the second term), the distance required by a vehicle to decelerate to a stop and then accelerate back to speed is used as the denominator in equation 19 rather than the actual queue length, Lq.

E_I^S = modified MOBILE1 composite idle emission factor for specified scenario S, (i.e., specified year cold starts and hot starts, temperature, vehicle mix, etc.)

$$E_C^S = E_C \frac{E_{FTP}^S}{F_{FTP}^{base}}$$

$$E_D^S = E_D \frac{E_{FTP}^S}{E_{FTP}^{base}}$$

$$E_A^S = E_A \frac{E_{FTP}^S}{E_{FTP}^{base}}$$

where E_{FTP}^{base} = the MOBILE1 composite emission estimate at the average speed for which E_C, E_A, or E_D were calculated and a stabilized 100 percent LDV vehicle mix for 1977 low altitude.

E_{FTP}^S = the MOBILE1 composite emission estimate for the specified scenario.

These equations multiply the Modal Model emission estimate by the ratio of two MOBILE1 emission estimates, one for the scenario of interest and one at the same conditions as the Modal Model.

Dispersion Calculations

The lane-by-lane emissions for each link are used by the EPA HIWAY Model[5] or the Street Canyon Model[6] for the calculation of hourly carbon monoxide concentrations at selected receptor locations.

Since the EPA HIWAY Model has been described in detail elsewhere,[5] we will present here only a brief discussion of its operational characteristics. The contribution of each small element of roadway to the concentration at a receptor location is calculated as a function of wind direction, windspeed and stability by use of the gaussian plume formula. The contribution of the entire length of the roadway is obtained by line integration of the expression. Since the HIWAY Model was designed originally to accept emissions input for an entire street (both directions of travel), it will accept only the following numbers of lanes: 1, 2, 4, etc. It also requires the input of a median strip width. Since we desired to input data to HIWAY (now a subroutine of the IMM) on a link-by-link basis the median width was set equal to zero, but the lane number restriction still remained so that three lanes per link could not be used. One way to circumbent this problem is to assume a fourth lane with zero volume and increase the link volume so that the link volume divided by the

new number of lanes gives the same volume per lane. This will ensure that the queue lengths and delays will be calculated properly. Then the fraction of link emissions assigned to each lane must be multiplied by the ratio of the number of old lanes to the number of new lanes with the fraction assigned to the new lane equal to zero. This second step will ensure that the emissions per lane will not be affected. In any case, the user must remember to locate the link centerline at the physical centerline of the link. The HIWAY Model will assume that all lanes have the same width and that the width of each lane is equal to the link width divided by the number of lanes. Another complication that may arise is the fact that the IMM requires that each intersection have four approaches - two for each of the two phases. If an actual intersection has fewer than four approaches, then a dummy approach must be specified with a very small volume (i.e., some fraction of a vehicle per hour) or the program will end execution with an error.

The Street Canyon Model is used only for those link-receptor combinations for which the user has indicated a potential of a street canyon, and for which the following test in IMM holds on an hourly basis.[13]

$$H > 7\sqrt{\frac{KW}{u}} \tag{20}$$

where H = building height (m)

W = street canyon width (m)

u = windspeed (m/sec)

K = turbulent diffusivity (m^2/sec)

Values for K are 25.5, 5.5, 1.75, 1.0, 0.5 and 0.5 m^2/sec for atmospheric stabilities 1 through 6 (A through F), respectively. Once both of the conditions for a street canyon configuration are met, the concentration assigned to a street canyon receptor will depend upon which side of the street the receptor is located and the direction of the wind with respect to the street orientation. The assignment of a receptor to either the windward or leeward side of the street canyon is illustrated by Figures 2 and 3. For a receptor located at the leeward side of the street canyon the concentration, C_L (g/m^3), is given by:

$$C_L = \frac{KQ}{(u + 0.5)\left[(x^2 + z^2)^{\frac{1}{2}} + L_o\right]} \tag{21}$$

where K = empirical nondimensional constant ($\simeq$ 7)

Q = line source emission rate for a particular lane of a link (g/m/sec)

L_o = approximate vehicle size ($\simeq$ 2 m).

The windward concentration, C_W (g/m^3), is calculated by the following expression:

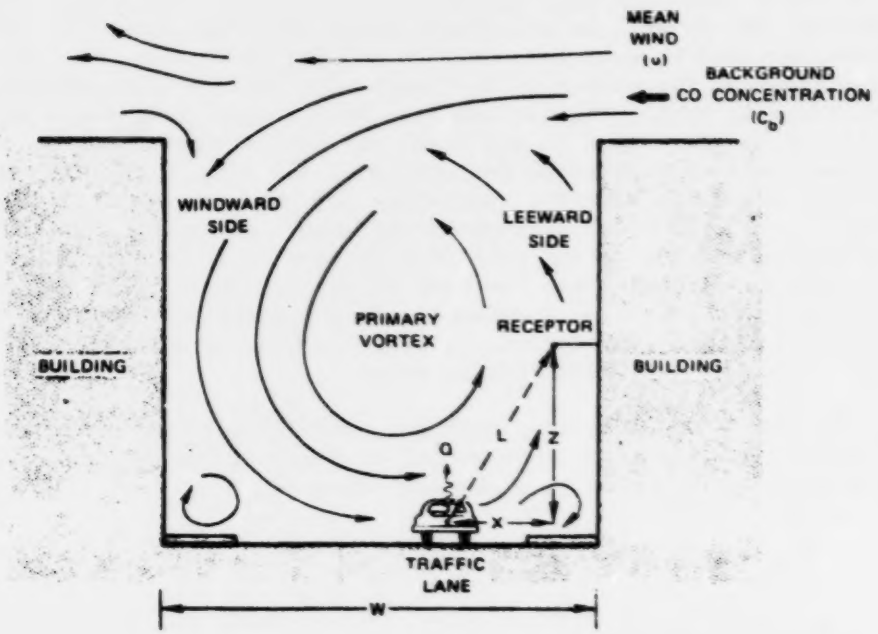

Figure 2. Schematic of cross-street circulation between buildings.

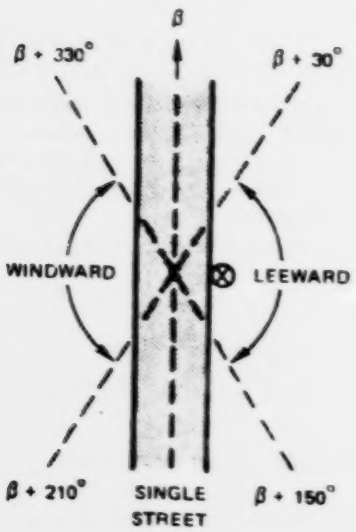

Figure 3. Specification for leeward and windward cases on the bases of receptor location, street orientation, and wind direction.

$$C_W = \frac{KQ\ (H-z)}{W\ (u + 0.5)\ H} \tag{22}$$

If the wind direction for a given hour does not place the receptor either on the windward or leeward side of the street canyon, then the concentration is calculated by:

$$C_I = \frac{1}{2}\ (C_L + C_W) \tag{23}$$

The lane emission rates for the pseudolink will be included in the line source emission rate, Q, for the street canyon configuration, if a perpendicular from the receptor to the physical link crosses the pseudolink. Otherwise, only physical link emission rates are included.

SECTION 2

PROGRAM INPUT DESCRIPTION

The IMM Model will currently accept data for two intersections with a maximum of two phases per intersection.* The program can handle up to four lanes of traffic on each link into or out of the intersection, and the CO concentration for up to 10 receptors can be calculated for 24 hourly observation times. All the above limitations can be removed by appropriately changing the dimensioned variables in the main program, and in subroutine PTHWY. In order to determine on which side of the street a receptor is located, and be consistent with the convention for lane assignment in "HIWAY," it has to be realized that the lane assignments are from left to right when looking from the initial link coordinates to the end coordinates of the link, and the side of the street is determined when looking from the initial link coordinates to the end link coordinates. This lane assignment scheme is shown in Figure 4. For consistency, it is desirable to have the second y coordinate greater than or equal to the first y coordinate.

When preparing the input to IMM, the first step should be the generation of a detailed drawing of the intersections to be modeled, and defining a localized coordinate system with one axis parallel to the north-south direction, and the second axis parallel to the east-west direction. Once the intersection has been defined, the traffic data should be obtained along with the speed limits for each traffic link, the typical deceleration into and acceleration out of the intersection. If the intersection has a fixed cycle time, the cycle time and green times for all phases of the intersection are required. The local meteorological data should be obtained for the days being modeled. It is desirable to have a local measurement of wind speed, direction and temperature if it is available; otherwise, the closest weather bureau station can be utilized. If the mixing height data is available, it should be utilized, but in general unless the mixing height is very low, (<100 m) the plume will not reach the mixing height in the region being studied. From the meteorological data, and solar elevation, the stability index for each hour must be calculated.

The input sequence of the data is given in Table 1. The first card contains the number of hours to be simulated up to 24, the number of receptors up to 10, and the number of intersections up to two. Only one case can be run at a time; that is, if there is more than one intersection, they are assumed to

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*The program assumes four links approach each intersection. Further, the total number of links leaving intersections must be equal to 8 + (Number of Intersections - 1)*6 - Number of Links Approaching an Intersection.

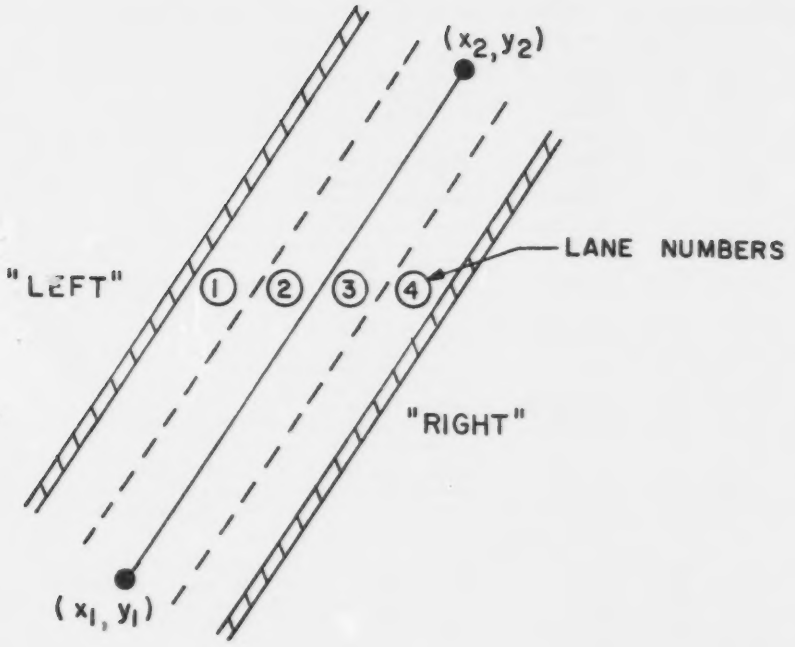

Figure 4. Lane assignment and left-right configuration used in the IMM.

TABLE 1. INPUT DATA TO INTERSECTION MIDBLOCK MODEL (IMM)

	Column	Format	Variable	Description	Units
	1-5	I5	IPRSW1	If 1 print intermediate emission data	-
	6-10	I5	IPRSW2	If 1 print SOA, HOA, EMAD	
	11-15	I5	IPRSW3	If 1 read in observed queue and delay	
	16-20	I5	IPRSW4	If 1 print MOBILE1 emission estimates	
Card 1,	1-5	I5	NHOURS	Number of hours	-
	6-10	I5	NREC	Number of receptors	-
	11-15	I5	NINSEC	Number of intersections	-
Card 2,	1-10	I10	IFREE(INS)	0 = free flow; 1 = interrupted flow	-
	11-20	F10.0	XC(INS)	X - Coordinate of the center of the intersection	km
	21-30	F10.0	YC(INS)	Y - Coordinate of the center of the intersection	km
Card 3,	1-5	I5	ISIG(INS)	Type of intersection 0 = unsignalized 1 = vehicle actuated 2 = fixed time	-
	6-10	I5	NPHASE(INS)	Number of phases	-
	11-15	F5.0	GAP(INS)	Gap acceptance time for unsignalized intersection	seconds
Card 3a,	1-10	F10.0	CY(INS)	Cycle time for fixed time intersection	seconds
	11-20	F10.0	G(INS,J)	Green time for each phase - Approach 1	seconds
	21-30	F10.0	G(INS,J)	Green time for each phase - Approach 2	seconds
Card 4,	1-5	I5	LINK(I,J,INS)	Link identification code	-
Card 5,	1-10	F10.0	X1(L)*	X - Coordinate of the beginning of the link	km
	11-20	F10.0	Y1(L)*	Y - Coordinate of the beginning of the link	km
	21-30	F10.0	X2(L)*	X - Coordinate of end of the link	km
	31-40	F10.0	Y2(L)*	Y - Coordinate of end of the link	km
	41-50	F10.0	WLINK(L)*	Width of the link	meters
	51-60	F10.0	HLINK(L)*	Emission height	meters
	61-70	F10.0	ICUT(L)*	0 = grade section 1 = cut section	-
	71-75	F5.0	WIDTC(L)*	Width of top of cut section	meters
Card 6,	1-10	F10.0	CS(I,J,INS)	Lane capacity	vehicles/hour
	11-20	F10.0	VOL(I,J,INS)	Volume of link	vehicles/hour
	21-30	F10.0	VIN(I,J,INS)	Velocity into intersection	miles/hour
	31-40	F10.0	VOUT(I,J,INS)	Velocity out of intersection	miles/hour
	41-50	F10.0	AIN(I,J,INS)	Deceleration into intersection	miles/hour/sec
	51-60	F10.0	AOUT(I,J,INS)	Acceleration out of intersection	miles/hour/sec
Card 7,	1-10	F10.0	NL(L)	Number of lanes for the link	-
	11-50	4F10.0	VFRACT(LANE,L)	Fraction of volume for each lane	-
	Repeat cards 4 to 7 for each phase, and for the two approaches to the intersection				
	Repeat cards 2 to 7 for each intersection				
Card 8,	Same as card 5				

(continued)

TABLE 1 (continued).

	Column	Format	Variable	Description	Units
Card 9	1-10	F10.0	VOLP(L)	Volume	vehicles/hour
	11-20	F10.0	VP(L)	Velocity	miles/hour
Card 10,	Same as card 7				
	Repeat cards 8 to 10 for each link departing from the intersection				
Card 11,	1-10	F10.0	XX(IR)	X - Coordinate of receptor	km
	11-20	F10.0	YX(IR)	Y - Coordinate of receptor	km
	21-30	F10.0	Z(IR)	Z - Coordinate of receptor	m
	31-40	I10	ISTR(IR)	1 = street canyon	-
Card 11a,	1-5	I5	NLDUM	Number of links adjacent to street canyon	-
	6-15	2I5	ISTLIN(IR,M)	Link adjacent to street canyon	-
Card 11b,	1-10	F10.0	AST(IR)	Street heading from North	degrees
	11-20	F10.0	WST(IR)	Canyon width	meters
	21-30	F10.0	BUILDH(IR)	Building height	meters
	31-40	I10	IRSIDE(IR)	1 = Right side of street 2 = Left side of street	-
	Repeat cards 11 to 11b from all receptors				
Card 12,	1-10	F10.0	THETA(K)	Wind direction	degrees
	11-20	F10.0	U(K)	Wind speed	meters/s
	21-30	F10.0	HL(K)	Height of mixing layer	meters
	31-40	I10	KST(K)	Stability code	-
	41-50	F10.0	TEMPF(K)	Ambient temperature	°F
	51-60	F10.0	FHOT(K)	Percentage of hot starts	-
	61-70	F10.0	FCOL(K)	Percentage of cold starts	-
	Repeat card 12 for each hour of simulation				
Card 13,	1-80	7F10.0, F5.0	FAC(K)	Ratio of hourly volume to volume specified on card 6	-
Card 14	1-5	I5	NYEAR†	Year being modeled	-
	6-10	I5	IREG†	Region (1 = low, 2 = Calif., 3 = high)	-
	11-20	F10.0	MS(1)†	Proportion of LDV	-
	21-30	F10.0	MS(2)†	Proportion of LDT1	
	31-40	F10.0	MS(3)†	Proportion of LDT2	-
	41-50	F10.0	MS(4)†	Proportion of HDV-G	
	51-60	F10.0	MS(5)†	Proportion of HDV-D	
	61-70	F10.0	MS(6)†	Proportion of MC	-
Card 15	1-5	I5	ALHFLC†	Flag for optional data on card (1=YES,0=NO)	
	6-15	F10.0	AC†	Fracion of vehicles using air-conditioning	
	16-25	F10.0	XLOAD(1)†	Fraction of LDV with additional 500 lbs load	
	26-35	F10.0	XLOAD (2)†	Fraction of LDT1 with additional 500 lbs load	-
	36-45	F10.0	XLOAD(3)†	Fraction of LDT2 with additional 500 lbs load	
	46-55	F10.0	TRAILR†	Fraction of LDV with 1000 lbs trailer	
	56-65	F10.0	ABSHUM†	Absolute humidity	gr/lb

(continued)

TABLE 1 (continued).

	Column	Format	Variable	Description	Units
Card 16	1-5	I5	TRKFLG*	Flag for optional data on card (1=YES,0=NO)	-
	6-15	F10.0	HGHGT†	Vehicle weight, gas HDV	pounds
	16-25	F10.0	HDWGT†	Vehicle weight, diesel HDV	pounds
	26-35	F10.0	HGCID†	Displacement, gas HDV	$in.^3$
	36-45	F10.0	HDCID†	Displacement, diesel HDV	$in.^3$
Card 17	1-5	I5	IMFLG†	Flag for optional data on card (1=YES,0=NO)	-
	6-10	I5	ICYIM†	Year of implementation of I/M	Last two digits
	11-15	I5	ISTRIN†	I/M stringency	Percentage
	16-20	I5	IMTFLG†	Mechanics training	1=Yes,0=No
	21-25	I5	MODYR1†	First model year I/M applies to	Last two digits
	26-30	I5	MODYR2†	Last model year I/M applies to	Last two digits
	If IPRSW3 = 1, repeat Card 18 for each approach I during phase J at intersection INS. Otherwise omit.				
Card 18	1-10	F10.0	QLENGTH (I,J,INS)	Queue length	meters
	11-20	F10.0	DELAY (I,J,INS)	Delay	seconds

*See HIWAY for more detail.

†See MOBILE1 for more detail.

be linked, and all traffic link emissions are utilized to calculate the receptor concentrations. If one wished to analyze a single intersection for a variety of different design characteristics, the model would have to be run in an iterative fashion.

The second input card specifies whether the intersection is signalized, and approximate coordinates for the center of the intersection. These coordinates need not be exact since they are only used to determine which end of the link is closest to the intersection.

The third input card requires the data to determine the type of signalization, the number of phases for the intersection, and the gap acceptance time of the intersection if it is unsignalized. For fixed cycle time intersections, card 3A contains the cycle time and the green time for each phase. If the intersection is unsignalized, or demand actuated, the card is omitted. For unsignalized intersections, the first phase is considered the main street and has the right of way, thus experiencing no queues or delays. It should be pointed out that the unsignalized intersection refer only to two-way stops, not four-way stops.

Cards 4 to 7 detail all the parameters that define each traffic link approaching the intersection. Card 4 contains the link number, which should start with one, and be incremented for each successive link. On Card 5, the parameters defining the physical link are entered: the beginning and end points of the link, the width of the link, the emission height, whether the link is at grade or a cut section, and the width of the top of the cut section. If a cut section is specified, no receptors may be located within the cut (see Reference 5). Card 6 contains the average lane capacity for all lanes in the link, the volume for the link, the velocity into and out of the intersection, and the deceleration and acceleration at the intersection. Card 7 contains the number of lanes, and the fractional volume per lane.

The input stream requires that all links approaching an intersection be read before data for another intersection is read in. Additionally, the two approaches for each phase at an intersection must be read before the data for the next phase are read.

After all links approaching the intersections have been read, the remaining links going away from the intersections are read in. Card 8 specifies the physical parameters of the link, and the input format is the same as Card 5. In defining the length of the links, links approaching the intersection should terminate at the curb of the crossing street, and the links going away from the intersection should originate at the end point of the approaching link.* In this way cruise emissions are emitted from the center of the intersection. The next card is Card 9 and contains the link volume and speed limit for the

*The links need not necessarily be connected. While a standard intersection should be setup as described above, the links need not be connected and can be located anywhere. In this manner, more complex configuration can be modeled.

link. Card 10 contains the number of lanes and the fractional volume per lane. Cards 8 to 10 are read for each link going away from the intersection.

When all the link data have been read, the receptor data are read in. Card 11 contains the coordinates of the receptor and a code signifying whether the site has the potential of developing a street canyon vortex. If the site is a potential street canyon site, two additional data cards are required. Card 11a specifies the number of physical links adjacent to the receptor and the link identification number for those links. Card 11b tabulates the street heading, the canyon width, the building height and a code to signify the side of the street the receptor is on when looking down the street along the street heading. The street heading can refer to either direction; it is only important that the street heading and variable IRSIDE be consistent.

When all receptors have been defined, the meteorological data are read for each hour of the simulation. The input data for Card 12 contains the wind direction, windspeed, height of mixing layer, stability index, temperature, fraction of hot starts and fraction of cold starts. The fraction hot/cold starts is required to calculate the correction factor to the CO concentration.

After the meteorological data have been read, the next set of data cards contains the fraction of the volume for each link that is to be used for each hour. The cases that have been run with IMM have put the average daily traffic (ADT) for the link volume, and on Card 13 the fraction of ADT that occurs in each hour is tabulated. In other words, the link volumes that were input on Card 6 are distributed on an hourly basis using the fraction input on Card 13; these fractions apply to all links.

In order to correct the CO emissions for the year being modeled, the following data are required: (1) year being modeled, (2) the region, and (3) distribution of vehicles as light-duty, light-duty trucks, heavy-duty gasoline powered trucks and heavy-duty diesel powered trucks. These data appear on Card 14.

Cards 15, 16, and 17 describe supplemental information for correcting the emissions estimates. They are identical to the factors used in MOBILE1. Before using Card 17 one should verify that the most recent version of the I/M credits are implemented in the program.

Card 18 is used to input observed queue lengths and delay, thereby overriding the traffic models calculations.

The program was designed to be applied to the analysis of one or two intersections. However, it can handle any configuration that can be adapted to the above input format. For example, since the program expects four approaching links per intersection, the analysis of an intersection of two one-way streets can be accommodated by entering two dummy approaching links with volumes of zero. T-intersections can be handled in a similar manner. Freeway locations are handled in a similar manner, that is, a dummy intersection is setup with zero cross volumes. The links departing from the intersection

can then be used for other freeway segments located elsewhere. The flag IFREE should be set equal to 0 so that the emissions of the pseudolink are ignored (i.e., only cruise emissions are calculated.) In this manner, a complex network of two intersections, an interchange between two freeways, and several on-off ramps were analyzed by the author with only two executions of IMM.

IMM is not well suited to analyze a single line source. Such situations will, in most cases, be more easily handled by running MOBILE1 and HIWAY separately.

SECTION 3

SUBROUTINE DESCRIPTION

SUBROUTINE ACDC

The purpose of this subroutine is to calculate the total emissions of CO by a vehicle accelerating from stop to a terminal velocity at a constant rate. Alternatively, the emissions generated by decelrating from a specific speed to stop at a fixed rate can be determined. The integrated Model Model equtions were utilized to calculate the total CO emission for the acceleration or deceleration mode.

SUBROUTINE CRUZ

This subroutine utilizes the Modal Model emission coefficients to calculate the CO emission for vehicles traveling at a fixed rate of speed.

SUBROUTINE DECIDE

The purpose of this subroutine is to determine if a receptor is adjacent to a queue at a signalized intersection when the street canyon effect has developed. If the queue is not adjacent to the receptor, it is not included in the determination of the CO concentration at the receptor.

SUBROUTINE INITMM

This subroutine utilizes the composite vehicle age and mileage distribution calcualted in SUP8 to calcualte the vehicle distribution in the 20 modal model vehicle groupings. It also sets up the array of modal model coefficients.

SUBROUTINE PTHWY

This subroutine is basically the model "HIWAY" where all the input data is transmitted through the subroutine argument list. All subroutines associated with "HIWAY" have not been altered, and a complete description of the model can be found in Reference 1. This subroutine calls DBTLNE, DBTRCX, and DBTSIG.

SUBROUTINE SUP8

This subroutine calculates the average driving cycle emission factors and idle emission factors based on the parameters supplied to it. It, in turn, calls subrotuine OUTPUT, EFCALX, BIGCDX, INITEX, TFCALX, SPFCLX, BEFGEN, GETCUM, EFALTX, CCEVAX, LDVIMX, ALUH, TRKOPC.

SUBROUTINE STREET

This subroutine utilizes the "Street Canyon" model to determine the CO concentration when a street canyon vortex develops at a monitor site. The leeward and windward CO values are calculated, and the appropriate value is returned to the calling program, depending on the angle between the wind direction and the street heading.

SUBROUTINE TRAFIC

Subroutine TRAFIC calculates the cycle and green times for demand actuated signalized intersections. The cycle time and green times for signalized intersections and the gap acceptance time for unsignalized intersection are then utilized to calculate the queue lengths and delay times for all phases of the intersection.

SECTION 4

DESCRIPTION OF OUTPUT

The output of IMM consists of three sections:

- a description of input data
- intermediate calculations of emission flux on each link
- the resulting concentrations at each receptor, with the contribution from each link.

A sample output listing is shown in Appendix C. The sample output listing and description of it below corresponds to the output when IPRSW1 equals 1. If this equals zero, most of the intermediate data is not printed.

INPUT DATA

The first part of this section of the output lists the number of hours, receptors, and intersections. Then, for each intersection, the signal characteristics and intersection coordinates are printed. The input data for each link approaching this intersection is printed. After data on all the intersections have been printed, the input data for all the links not approaching an intersection is printed. The program then prints out the total number of actual links (i.e., not including pseudolinks) in the input stream.

The next part of the output is a listing of the coordinates of each receptor in the input stream. If the receptor has been flagged by the user as having street canyon potential, the additional input data necessary for the street canyon calculation is printed. After the data on each receptor, the meteorological data for each hour is printed. In addition, since hot and cold starts and temperature are input on an hourly basis, this data is also printed in this section.

The last part of the input data that is printed is the hourly traffic volume ratios and the emission correction factor data. The year, region, and modal split are always printed. If any of the supplemental corrections are indicated (i.e., ALHFLG, TRKFLG, or IMFLG equal 1), the corresponding input data is also printed.

INTERMEDIATE CALCULATIONS

The next section of output is concerned with the emission calculation. First, the idle emission factor calculated by the program is printed. Then the deceleration, acceleration, and cruise emission factors are printed for

each link approaching an intersection. Next, the cruise emission factors for links not approaching an intersection are printed.

The next part of the output shows the calculations from subroutine TRAFFIC. For each link approaching an intersection, the following information is presented: approach, phase, and intersection index numbers, volume, capacity, signal code number, queue length in meters, delay time in seconds, number of signal phases, gap acceptance time for unsignalized intersections, link number, a flag NQND (1 meaning no queue, no delay), the signal cycle time, and the green time.

The final part of this segment of the output lists the emission rates for each link and pseudolink.

CONCENTRATIONS

The final segment of the output lists the concentrations at each receptor and the contribution from each link. First, for each link, its contribution to each receptor is printed. If a link has a potential street canyon receptor associated with it and a street canyon circulation does develop, the program prints out certain additional information.

First, it prints the horizontal distance between the center of the left-most lane and the right-hand side of the street canyon (XLL) and the angle between the link and a line constructed between the initial coordinates of the link and the receptor (THETPP). If the link is a pseudolink, the results of subroutine DECIDE are printed (IANS equal to 1 means the pseudolink is next to the receptor). Next, XLL is printed for every lane in the link. Finally, the results of subroutine street are printed. The concentration is in micrograms per cubic meter.

The last section of the output summarizes the concentrations for the hour at each receptor. The total concentration is the sum of the contributions from each link. Where the street canyon concentration was calculated from any of the links at a receptor, the street canyon concentration replaced the concentration calculated by HIWAY. Thus the total concentration is the sum of the contributions from all the links, calculated by either the HIWAY or street canyon models.

SECTION 5

USE OF THE INTERSECTION-MIDBLOCK MODEL (IMM) IN CONJUNCTION WITH APRAC-1A OR APRAC-2

Since the IMM will handle no more than two intersections, the concentrations calculated for the model receptor locations will certainly not reflect the carbon monoxide contributions from the rest of the urban area. If application of the model shows that concentrations close to the standard might be expected, then some means must be found to include the remaining links of the traffic network in the analysis. For those receptors located quite close to roadways or intersections the contribution of other link emissions to the carbon monoxide concentration is often small in comparison to the contribution of the roadway or intersection in question. On the other hand, for those receptors not immediately adjacent to the roadway or intersection, this contribution can become a much greater fraction of the total concentration, especially in a large urban area and when a low mixing prevails for an extended period of time.

One method to obtain quantitative estimates of the contributions of links not included in the IMM is by use of the APRAC-1A[7-10] or APRAC-2[12] computer models, which are designed for the prediction of hourly CO concentrations at specific receptor locations based upon traffic link emissions and meteorological data. The concentrations contribution at a particular receptor location from links other than the receptor street is calculated by means of a receptor oriented Gaussian plume model. For a given hour the model sets up a series of area sources upwind of the receptor point. Each of these area sources is assigned an emission strength based upon the link elements contained within each. The vertical dispersion of the CO plume occurring between the area source and receptor will depend upon a vertical dispersion parameter, which is in turn a function of windspeed, cloud cover, and time of day. The dilution factor of CO along the axis of the plume is proportional to the windspeed.

For the most part, the differences between APRAC-1A and APRAC-2 are insignificant when the models are used to estimate the intraurban background or mesoscale component. Most users will find APRAC-1A preferable in that it costs one-quarter to one-half as much as APRAC-2 to execute. The principal differences between the models and their importance in the application considered here are reviewed below:

- Emissions Calculations - In the APRAC-1A program emissions, E, are parameterized simply in the form of an emission factor power law as:

$$E = \alpha S^{-\beta}$$

where E = emission factor (gm/veh/mi)

α,β = average traffic speed (mi/hr)

The speed S is available for the emission factor calculation since each link in the data set is characterized by one of eight speed classes.

This formulation, compared to APRAC-2 is very inexpensive in terms of computer time. One minor complication is that the α and β constants must be calcualted for the emission characteristics of the vehicle population. This implies that only one value of cold starts and the other emission parameters are applied universally. A different year or time period would require new constants.

APRAC-2, on the other hand, explicitly calculates the emission factors according to Supplement 5 of AP-42. Different cold starts proportions can be applied to separate locations in a region and different time periods. A unique speed on each link can be input or speed can be calculated using a capacity restraint model. Consequently, APRAC-2 can calculate emissions with much greater sensitivity. The effect of such an enhancement on the calculation of the mesoscale component is unknown. (IMM, of course, is sensitive to these parameters and they are considered in the calculation of the microscale component.) APRAC-2 can be updated to reflect the new motor vehicle emission factors.[15] Although this modification has been performed, no documentation is currently published.

- Multiple Wind Field - APRAC-2 can accommodate wind measurements from multiple locations in the regions; unique values of speed and directions are then interpolated for each receptor. Where such data are available and show significant variation, the use of APRAC-2 should be considered.

- Local Source Models - APRAC-1A and APRAC-2 provide for the use of a street canyon submodel; APRAC-2 also provides for the use of an intersection submodel. Since IMM already treats these situations, these options should not be used again when APRAC is used to calculate the mesoscale component.

- Dispersion Model Options - The following options are available to the user of the APRAC-1A model:

  - Synoptic Calculation - Source receptor relationships are recalculated for each new hour of meteorological data. This option should be used if the program is being run to simulate only a limited number of hours (e.g., 24 hours).

- Climatological Calculation - Source receptor relationships are calculated at the beginning of the program for a wide range of meteorological configurations and written on a direct access device. The appropriate normalized concentrations for each source-receptor pair are then reread for the meteorological configuration which prevails at a given hour. The climatological option should be used for the simulation of a large number of hours. The final decision as to whether the synoptic or climatological options should be used must also depend upon the relative cost of CPU time and direct access I/O at the facility where the model is being run.

- Grid Point Calculation - Carbon monoxide concentrations are calculated at up to 625 receptor locations for a specified hour of the day. This option would not be especially useful in conjunction with the application of the IMM since the user would be more interested in the concentration at a small number of receptors for more than a single hour.

The APRAC-2 model has retained these options; however, their use is implicit depending on the input data supplied to APRAC-2. APRAC-2 limits a user to 10 receptors for a 24-hour execution and one receptor for a multiday execution.

- Traffic Volume Data - The basic traffic input for the APRAC-1A model is the number of vehicles per day for an array of links whose end point coordinates are specified on a rectangular system in units of 0.01 miles. To account for the curvature of a particular link, the actual length of the roadway between the end point is input. Each link is also assigned an appropriate speed classification. Nonlink traffic volumes may be assigned to grid squares superimposed upon the traffic network. The daily traffic flow volume is apportioned for each hour of the day according to hourly traffic flow distributions specific to weekdays, Saturdays, and Sundays. There is also the option in the program of selecting a given hour of the day as a peak hour.

  APRAC-2 treats link-based traffic data in a similar manner. In addition, APRAC-2 has an option for accepting FHWA type binary link file via a preprocessor. Nonlink traffic volume can be assigned the same way as APRAC-1A or can automatically be computed by the model. Daily traffic flow is apportioned for each hour according to diurnal distributions as in APRAC-1A. However, instead of diurnal factors for five facility types as in APRAC-1A, APRAC-2 requires diurnal distributions for two facility types, for two directions, for five locales (i.e., CBD, commercial, residential, industrial and rural) - a total of 20. There is no peak-hour factor.

Once the IMM has been run for a group of selected receptor locations for a particular set of hours, the APRAC should run for the same set of receptor and hours and the APRAC mesoscale concentrations added to the microscale concentrations calculated by the IMM. The user should make sure that the links included in the IMM simulation are not used for the APRAC-1A network. In practice, it would be better to run the APRAC before the IMM is run so that stability classes calculated by APRAC could be input to the IMM.

SECTION 6

REFERENCES

1. Midurski, T. P., and F. Benesh. Carbon Monoxide Hot Spot Guidelines. Volume I. Prepared by GCA/Technology Division for the U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711. August 1978. EPA-450/3-78-033.

2. Benesh, F., and T. P. Midurski. Carbon Monoxide Hot Spot Guidelines. Volume II. Rationale. Prepared by GCA/Technology Division for the U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711. August 1978. EPA-450/3-78-034.

3. Dabbert, W. F., R. C. Sandys, and P. A. Buder. ISMAP - A Traffic/Emissions/Dispersion Model for Mobile Pollution Sources. User's Manual. Prepared for California Business Properties Association by Stanford Research Institute. Menlo Park, California 94025.

4. Automobile Exhaust Emission Modal Analysis Model, EPA-460/3-74-005. January 1974.

5. User's Guide for HIWAY, A Highway Air Pollution Model, EPA-650/4-74-008. February 1975.

6. Compilation of Air Pollutant Emission Factors, Supplement 5 (AP-42). U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711. April 1975.

7. Mancuso, R. L., and F. L. Ludwig. User's Manual for the APRAC-1A Urban Diffusion Model Computer Program. Contract CAPA-3-68 (1-69), Stanford Research Institute, Menlo Park, California. 119 pp. (NTIS-PB 213 091). 1972.

8. Ludwig, F. L., W. B. Johnson, A. E. Moon, and R. L. Mancuso. A Practical Multipurpose Diffusion Model for Carbon Monoxide. Final Report, Contracts CAPA-3-68 and CPA 22-69-64, Stanford Research Institute, Menlo Park, California. 184 pp, (NTIS-PB 196 003). 1970.

9. Johnson, W. B., W. F. Dabberdt, F. L. Ludwig, and R. J. Allen. Field Study for Initial Evaluation of an Urban Diffusion Model for Carbon Monoxide. Comprehensive Report, Contract CAPA-3-68 (1-79), Stanford Research Institute, Menlo Park, California. 240 pp, (NTIS-PB 203 469). 1971.

10. Ludwig, F. L., and W. F. Dabberdt. Evaluation of the APRAC-1A Urban Diffusion Model for Carbon Monoxide. Final Report, Contract CAPA-3-68 (1-69), Stanford Research Institute, Menlo Park, California, 167 pp. (NTIS-PB 210 819). 1972.

11. Users Guide to the MOBILE1 Program. Office of Transportation and Land Use Policy, U.S. Environmental Protection Agency, Washington, D.C. 1978.

12. Ludwig, F., et al. Users Manual for the APRAC-2 Emissions and Diffusion Model. Prepared by Stanford Research Institute, Menlo Park, California, for the U.S. Environmental Protection Agency, Region IX. 1977.

13. Georgii, H. W., et al. Investigation of the Temporal and Spatial Distribution of Immission Concentration in Frankfurt/Main, Report No. 11 of the Inst. of Meteorol. and Geophys. of the U. of Frankfurt/Main (Translation No. 0477, Nat. Air Poll. Cont. Admin.) 1967.

14. Mobile Source Emission Factors. Office of Air and Waste Management. U.S. Environmental Protection Agency, Washington, D.C. EPA-400/9-78-005. March 1978.

APPENDIX A

PROGRAM LISTING OF INTERSECTION MIDBLOCK MODEL

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C          DATA SET PTIMM3      AT LEVEL 007 AS OF 06/07/78                    MAI00010
C***  INTERSECTION MIDBLOCK MODEL                                               MAI00020
C**********************                                                        MAI00030
C**********************                                                        MAI00040
C                                                                              MAI00050
C      VERSION 2 JANUARY 1978                                                  MAI00060
C         MODIFIED BY ADDITION OF 1975 MODAL MODEL COEFFICIENTS                MAI00070
C         WITH DETERIORATION TO JULY 1977                                      MAI00080
C         AND EMISSION CORRECTION ACCORDING TO SUPPLEMENT B                    MAI00090
C**********************                                                        MAI00100
C                                                                              MAI00110
C      GCA/TECHNOLOGY DIVISION                                                 MAI00120
C      BURLINGTON ROAD                                                         MAI00130
C      BEDFORD, MASSACHUSETTS                                                  MAI00140
C      (617) 275-9000                                                          MAI00150
C                                                                              MAI00160
C      VERSION 1 WRITTEN BY DR. R. PATTERSON AND DR. M. MILLS                  MAI00170
C      VERSION 2 PREPARED BY FRANK BENESH                                      MAI00180
C      FOR QUESTIONS, CALL F. BENESH OR VICTOR CORBIN                          MAI00190
C                                                                              MAI00200
C      PREPARED UNDER CONTRACT FOR U.S. E.P.A.                                 MAI00210
C      GEORGE SCHEWE PROJECT OFFICER                                           MAI00220
C      SOURCE RECEPTOR ANALYSIS BRANCH                                         MAI00230
C      OFFICE OF AIR QUALITY PLANNING AND STANDARDS                            MAI00240
C      RESEARCH TRIANGLE PARK, NORTH CAROLINA                                  MAI00250
C                                                                              MAI00260
C      THIS PROGRAM CALCULATES CO CONCENTRATIONS AT SELECTED                   MAI00270
C      RECEPTOR LOCATIONS BASED UPON LINE SOURCE EMISSION                      MAI00280
C      RATES AND HOURLY METEOROLOGICAL DATA.  EXCESS(IDLING PLUS               MAI00290
C      ACCELERATION/DECELERATION) EMISSIONS AND CRUSE EMISSIONS                 MAI00300
C      ARE CALCULATED FROM VALUES OF CRUSE SPEED, ACCELERATION/                MAI00310
C      DECELERATION, AND APPROACH VOLUMES BY USE OF THE EPA MODAL              MAI00320
C      ANALYSIS MODEL.  ACCELERATION/DECELERATION AND IDLING EMISSIONS         MAI00330
C      ARE ASSIGNED TO THE QUEUE LENGTH PORTION OF THE LINK WHILE              MAI00340
C      CRUSE EMISSIONS ARE DISTRIBUTED UNIFORMLY ALONG THE LENGTH OF THE       MAI00350
C      LINK.  QUEUE LENGTHS AND DELAY TIMES MAY BE CALCULATED FOR              MAI00360
C      UNSIGNALIZED,DEMAND ACTUATED AND FIXED TIME INTERSECTIONS.              MAI00370
C      THE LINE SOURCE CALCULATION IS CARRIED OUT BY USE OF THE EPA            MAI00380
C      HIGHWAY MODEL.  LINKS MUST BE NUMBERED CONSEQUTIVELY WITH THOSE         MAI00390
                                                                               MAI00400
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C     LINKS NOT APPROACHING ANY INTERSECTION INPUT LAST
C     THE PROGRAM ALSO PROVIDES THE OPTION OF A STREET CANYON SUBMODEL      MAI00410
C*********************                                                     MAI00420
C*********************                                                     MAI00430
      DIMENSION CS(2,2,2),VOL(2,2,2),VIN(2,2,2),VOUT(2,2,2),               MAI00440
     &AIN(2,2,2),AOUT(2,2,2),VOLP(22),VP(22),ISIG(2),NPHASE(2),GAP(2),     MAI00450
     &X1(22),X2(22),Y1(22),Y2(22),NL(22),VFRACT(4,22),WLINK(22),           MAI00460
     &HLINK(22),ICUT(22),WIDTC(22)                                         MAI00470
      DIMENSION THETA(24),U(24),HL(24),KST(24)                             MAI00480
     1,TEMPF(24),FHOT(24),FCOLD(24)                                        MAI00490
      DIMENSION XX(10),YY(10),Z(10),ISTR(10),AST(10),NLKST(10),            MAI00500
     &WST(10),BUILDH(10),ISTLIN(10,2),IRSIDE(10)                           MAI00510
      DIMENSION CONC(24,10),VOLHR(2,2,2,24),                               MAI00520
     &FAC(24),EMAOUT(2,2,2),EMAIN(2,2,2),EMCRUZ(2,2,2),                    MAI00530
     &QLENTH(2,2,2),DELAY(2,2,2),LINK(2,2,2),NQND(22),EMCRNI(22),          MAI00540
     &CY(2),G(2,2),EMLN(22,4),IFREE(2),XC(2),YC(2)                         MAI00550
      DIMENSION RK(5),ISTRH(10),EMLNP(22),C(10)                            MAI00560
      DIMENSION XLOAD(3),MS(6),STABL5(6)                                   MAI00570
      INTEGER STABL6,STABL7,STABL8,TRKFLG,ALHFLG                           MAI00580
      REAL MS                                                              MAI00590
C***  INPUT VARIABLES                                                      MAI00600
C*********************                                                     MAI00610
C*********************                                                     MAI00620
C     NHOURS=NUMBER OF HOURS INCLUDED IN THE SIMULATION                    MAI00630
C     NREC=NUMBER OF RECEPTORS                                             MAI00640
C     NINSEC=NUMBER OF INTERSECTIONS(4 APPROACH LINKS ASSUMED FOR EACH     MAI00650
C           INTERSECTION)                                                  MAI00660
C     NLNAI=NUMBER OF LINKS NOT APPROACHING ANY INTERSECTION               MAI00670
C     IFREE(INS)=0(FREE FLOW,IGNORE IDLING AND ACCELERATION/DECELERATION   MAI00680
C           EMISSIONS),=1(NO FREE FLOW)                                    MAI00690
C     XC(INS) = EAST COORDINATE OF THE INTERSECTION (KM)                   MAI00700
C     YC(INS) = NORTH COORDINATE OF THE INTERSECTION (KM)                  MAI00710
C     CS(I,J,INS)=CAPACITY PER HOUR OF GREEN TO VEHICLES ON APPROACH       MAI00720
C           LINK I MOVING DURING SIGNAL PHASE J FOR INTERSECTION           MAI00730
C           INS(VEHICLES/HOUR)                                             MAI00740
C     VOL(I,J,INS)=AVERAGE VOLUME ON APPROACH LINK I WHICH MOVES DURING    MAI00750
C           SIGNAL PHASE FOR INTERSECTION INS(VEHICLES/HOUR)               MAI00760
C     A LINK MAY HAVE MORE THAN ONE LANE.                                  MAI00770
C     AIN(I,J,INS)=ACCELERATION INTO THE INTERSECTION(MUST BE NEGATIVE)    MAI00780
C           (MI/HR/SEC)                                                    MAI00790
                                                                           MAI00800
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C     AOUT(I,J,INS)=ACCELERATION OUT OF THE INTERSECTION(MUST BE POSTIVEMAI00810
C           )(MI/HR/SEC)                                                MAI00820
C     VIN(I,J,INS)=INTERSECTION APPROACH SPEED FOR INTERSECTION INS,    MAI00830
C           SIGNAL PHASE J, AND APPROACH I(MI/HR)                       MAI00840
C     VOUT(I,J,INS)=INTERSECTION DEPARTURE SPEED FOR INTERSECTION INS   MAI00850
C           ,SIGNAL PHASE J, AND APPROACH I(MI/HR)                      MAI00860
C     VOLP(L)=VOLUME FOR LINK L IF LINK L DOES NOT APPROACH ANY         MAI00870
C     INTERSECTION(VEHICLES/HOUR)                                       MAI00880
C     VP(L)=SPEED FOR LINK L IF LINK L DOES NOT APPROACH ANY            MAI00890
C           INTERSECTION(VEHICLES/HR)                                   MAI00900
C     ISIG(INS)=INTERSECTION TYPE(0=UNSIGNALIZED,1=VEHICLE ACTUATED,    MAI00910
C           2=FIXED TIME)                                               MAI00920
C     CY(INS)=SIGNAL PHASE FOR FIXED TIME INTERSECTION(SEC)             MAI00930
C     G(INS,J)=GREEN TIME FOR FIXED TIME INTERSECTION INS AND PHASE J(SEMAI00940
C           C)                                                          MAI00950
C     GAP(INS)=GAP ACCEPTANCE FOR UNSIGNALIZED INTERSECTION INS(SEC)    MAI00960
C     NPHASE(INS)=NUMBER OF PHASES FOR INTERSECTION INS                 MAI00970
C     X1(L),Y1(L)=EAST AND NORTH COORDINATES OF ENDPOINT 1 OF LINK L    MAI00980
C           (KM)                                                        MAI00990
C     X2(L),Y2(L)=EAST AND NORTH COORDINATES OF ENDPOINT 2 OF LINK L    MAI01000
C           (KM)                                                        MAI01010
C     LINK(I,J,INS)=LINK NUMBER FOR APPROACH I FOR PHASE J AT           MAI01020
C           INTERSECTION INS                                            MAI01030
C     NL(L)=NUMBER OF TRAFFIC LANES FOR LINK L                          MAI01040
C     VFRACT(LANE,L) FRACTION OF TOTAL VOLUME OF LINK L ASSIGNED TO     MAI01050
C           LANE 'LANE'.  LANES FOR A LINK ARE ORDERED LEFT TO RIGHT    MAI01060
C           WHEN LOOKING FROM POINT 1 TO POINT2.                        MAI01070
C     WLINK(L)=WIDTH OF LINK(NOT THE ENTIRE STREET) L(METERS)           MAI01080
C     HLINK(L)=EMISSION HEIGHT FOR LINK L(METERS)                       MAI01090
C     ICUT(L)=1(CUT SECTION),0(AT GRADE SECTION)                        MAI01100
C     WIDTC(L)=WIDTC(L)=WIDTH AT THE TOP OF THE CUT SECTION(M)          MAI01110
C     THETA(K),U(K),HL(K),KST(K)=WIND DIRECTION(DEGREES),WINDSPEED      MAI01120
C           (METERS/SEC), MIXING HEIGHT(METERS),AND STABILITY CLASS     MAI01130
C           FOR HOUR K                                                  MAI01140
C     FAC(K)=RATIO OF VOLUME TO AVERAGE VOLUME FOR HOUR K               MAI01150
C     XX(IR)=EAST COORDINATE FOR RECEPTOR IR(KM)                        MAI01160
C     YY(IR)=NORTH COORDINATE OF RECEPTOR IR(KM)                        MAI01170
C     Z(IR)=HEIGHT OF RECEPTOR IR ABOVE GROUND(M)                       MAI01180
C     ISTR(IR)=0(EXCLUDE STREET CANYON MODEL),1(USE STREET CANYON       MAI01190
C           MODEL)                                                      MAI01200
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C     AST(IR)=DIRECTION OF STREET FROM NORTH(DEGREES)(0-180)                    MAI01210
C     NLKST(IR)=NUMBER OF LINKS INFLUENCING THE STREET CANYON RECEPTOR          MAI01220
C               IR                                                            MAI01230
C     WST(IR)=RECEPTOR STREET WIDTH(M)                                          MAI01240
C     BUILDH(IR)=BUILDING HEIGHT(M)                                             MAI01250
C     ISTLIN(IR,M=1,NLKST(IR))=IDENTIFICATION NUMBERS FOR THOSE LINKS           MAI01260
C               ADJACENT TO RECEPTOR IR                                       MAI01270
C     IRSIDE(IR)=SIDE OF THE STREET ON WHICH RECEPTOR IR IS                     MAI01280
C               LOCATED(1=RIGHT,2=LEFT) WITH RESPECT TO THE STREET            MAI01290
      INTEGER OUT                                                             MAI01300
      DATA CONC/240*0./,RK/25.5,5.5,1.75,1.0,0.5/                             MAI01310
      IN=5                                                                    MAI01320
      OUT=6                                                                   MAI01330
      IPRSW=1                                                                 MAI01340
C***  SELECTED INTERMEDIATE AND OUTPUT VARIABLES                              MAI01350
C********************                                                         MAI01360
C********************                                                         MAI01370
C     VOLHR(I,J,INS,K)=VOLUME FOR HOUR K ON APPROACH LINK I WHICH             MAI01380
C               MOVES DURING SIGNAL PHASE J FOR INTERSECTION INS              MAI01390
C               (VEHICLES/HOUR)                                               MAI01400
C     QLENTH(I,J,INS)=QUEUE LENGTH(M) FOR INTERSECTION INS FOR                MAI01410
C               APPROACH I AND PHASE J                                        MAI01420
C     DELAY(I,J,INS)=INTERSECTION DELAY FOR INTERSECTION INS FOR              MAI01430
C               APPROACH I AND PHASE J(SEC)                                   MAI01440
C     NQND(L)=0(IF LINK L APPROACHES A SIGNALIZED INTERSECTION OR             MAI01450
C               APPROACHES AN UNSIGNALIZED INTERSECTION AND IS NOT ON THE     MAI01460
C               MAIN STREET),=1(IF LINK L APPROACHES AN UNSIGNALIZED          MAI01470
C               INTERSECTION AND IS ON A MAJOR STREET)                        MAI01480
C     EMCRNI(L)=CRUSE EMISSION RATE(GM/VEHICLE/SEC) FOR LINK L IF             MAI01490
C               LINK L DOES NOT APPROACH AN INTERSECTION                      MAI01500
C     CY(INS)=CYCLE LENGTH(SEC) FOR INTERSECTION INS(DEMAND ACTUATED)         MAI01510
C     EMLN(L,LANE)=EMISSION RATE(GM/M/SEC) FOR LANE 'LANE' OF LINK L          MAI01520
C     CONC(K,IR)=CARBON MONOXIDE CONCENTRATION (PPM) AT RECEPTOR IR           MAI01530
C     RK(KST(K))=STABILITY DEPENDENT DIFFUSIVITIES FOR USE IN THE             MAI01540
C               STREET CANYON DECISION MODEL(M**2/SEC)                        MAI01550
C     ISTRH(IR)=0(EXCLUDE STREET CANYON MODEL FOR THE HOUR IN QUESTION)       MAI01560
C              =1(USE STREET CANYON MODEL FOR THE HOUR IN QUESTION)           MAI01570
C     EMLNP(LANE)=EMLN(L,LANE)                                                MAI01580
C     C(IR)=RECEPTOR CONCENTRATIONS FOR A GIVEN LINK AND HOUR UPON            MAI01590
                                                                              MAI01600
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C
                RETURN FROM SUBROUTINE HIWAY
      L=0                                                              MAI01610
      NLK=0                                                            MAI01620
      NPHM=0                                                           MAI01630
C*****IPRSW1=1(PRINT INTERMEDIATE EMISSION DATA)                       MAI01640
C     IPRSW2=1(PRINT SOA,HOA,EMAD,ETC)                                 MAI01650
C     IPRSW3=1(READ IN QUEUE & DELAY)                                  MAI01660
C     IPRSW4=1(PRINT OUT MOBILE1 EMISSION FACTOR CALCULATIONS)         MAI01670
      READ(IN,5) IPRSW1,IPRSW2,IPRSW3,IPRSW4                           MAI01680
    5 FORMAT(4I5)                                                      MAI01690
      WRITE(OUT,591)                                                   MAI01700
      READ(IN,10) NHOURS,NREC,NINSEC                                   MAI01710
   10 FORMAT(5I5)                                                      MAI01720
      WRITE(OUT,20) NHOURS,NREC,NINSEC                                 MAI01730
   20 FORMAT(1X,'NUMBER OF HOURS FOR THE SIMULATION=',I5,/,1X,'NUMEER OFMAI01740
     & RECEPTORS=',I5,/,1X,'NUMBER OF INTERSECTIONS',I5,/)             MAI01750
      DO 50 INS=1,NINSEC                                               MAI01760
      READ(IN,48) IFREE(INS),XC(INS),YC(INS)                           MAI01770
   48 FORMAT (I10,2F10.0)                                              MAI01780
      IF(IFREE(INS).EQ.0) GO TO 30                                     MAI01790
      WRITE(OUT,25) INS                                                MAI01800
   25 FORMAT (/,10X,'FOR INTERSECTION',I3,2X,                          MAI01810
     &'NO FREE FLOW CONDITIONS ASSUMED',//)                            MAI01820
      GO TO 40                                                         MAI01830
   30 WRITE(OUT,35) INS                                                MAI01840
   35 FORMAT (/,10X,'FOR INTERSECTION',I3,2X,                          MAI01850
     &   'FREE FLOW CONDITIONS ASSUMED',//)                           MAI01860
   40 CONTINUE                                                         MAI01870
C                                                                      MAI01880
C     INPUT INTERSECTION DATA                                          MAI01890
C                                                                      MAI01900
      READ(IN,52) ISIG(INS),NPHASE(INS),GAP(INS)                       MAI01910
   52 FORMAT(2I5,F5.0)                                                 MAI01920
      NPHM=MAXO(NPHM,NPHASE(INS))                                      MAI01930
      NPH=NPHASE(INS)                                                  MAI01940
      IF(ISIG(INS).EQ.2) GO TO 421                                     MAI01950
      GO TO 46                                                         MAI01960
  421 READ(IN,42) CY(INS),(G(INS,J),J=1,NPH)                           MAI01970
   42 FORMAT(8F10.0)                                                   MAI01980
                                                                       MAI01990
                                                                       MAI02000
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      WRITE(OUT,43) INS,CY(INS)                                          MAI02010
   43 FORMAT(/,10X,'FIXED CYCLE TIME FOR INTERSECTION',I5,1X,'=',F10.2,  MAI02020
     &1X,'SEC')                                                          MAI02030
      DO 45 J=1,NPH                                                      MAI02040
      WRITE(OUT,44) INS,J,G(INS,J)                                       MAI02050
   44 FORMAT (//,10X,'GREEN TIME FOR INTERSECTION',I3,1X,'PHASE',I3,1X,  MAI02060
     &'=',F10.2,1X,'SEC')                                                MAI02070
   45 CONTINUE                                                           MAI02080
   46 CONTINUE                                                           MAI02090
      IF(ISIG(INS).EQ.0) WRITE(OUT,461) INS,NPHASE(INS),GAP(INS)         MAI02100
  461 FORMAT(//,1X,'INTERSECTION',I3,1X,'IS UNSIGNALIZED',               MAI02110
     12X,'NPHASE =',I3,1X,'GAP =',F7.1,//)                               MAI02120
      IF(ISIG(INS).EQ.1) WRITE(OUT,462) INS                              MAI02130
  462 FORMAT(/,1X,'INTERSECTION',I5,1X,'IS CONTROLLED BY A DEMAND ACTUATMAI02140
     &ED SIGNAL')                                                        MAI02150
      WRITE(OUT,47) XC(INS),YC(INS)                                      MAI02160
   47 FORMAT (/,10X,'CENTER OF INTERSECTION IS',F7.3,' KM EAST AND',     MAI02170
     1F7.3,' KM NORTH')                                                  MAI02180
      NPH=NPHASE(INS)                                                    MAI02190
      DO 11 J=1,NPH                                                      MAI02200
      DO 11 I=1,2                                                        MAI02210
C                                                                        MAI02220
C     READ LINK CODE.                                                    MAI02230
C                                                                        MAI02240
      L=L+1                                                              MAI02250
      READ(IN,555) LINK(I,J,INS)                                         MAI02260
  555 FORMAT (I5)                                                        MAI02270
C                                                                        MAI02280
C     READ PHYSICAL LINK PARAMETERS.                                     MAI02290
C                                                                        MAI02300
      READ(IN,556) X1(L),Y1(L),X2(L),Y2(L),WLINK(L),HLINK(L),            MAI02310
     1ACUT,WIDTC(L)                                                      MAI02320
  556 FORMAT (7F10.0,F5.0)                                               MAI02330
      ICUT(L)=ACUT+0.001                                                 MAI02340
C                                                                        MAI02350
C     READ CAPACITY,VOLUME, VELOCITIES, AND ACCELERATION FOR EACH LINK.  MAI02360
C                                                                        MAI02370
      READ(IN,556) CS(I,J,INS),VOL(I,J,INS),VIN(I,J,INS),VOUT(I,J,INS), MAI02380
     2AIN(I,J,INS),AOUT(I,J,INS)                                         MAI02390
      IF(AIN(I,J,INS).GE.0.0) GO TO 5010                                 MAI02400
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      IF(AOUT(I,J,INS).LE.0.0) GO TO 5020                                MAI02410
C                                                                        MAI02420
C     READ THE NUMBER OF LANES FOR THE LINK, AND THE FRACTION            MAI02430
C     OF VOLUME ON EACH LANE.                                            MAI02440
C                                                                        MAI02450
      READ(IN,556) ANL,(VFRACT(LANE,L),LANE=1,4)                         MAI02460
      NL(L)=ANL+0.001                                                    MAI02470
C***  INPUT TRAFFIC LINK DATA.  A LINK IS ONE DIRECTION                  MAI02480
C***  OF TRAFFIC FLOW ON A STREET.  EACH                                 MAI02490
C***  LINK WILL HAVE ONE OR MORE LANES OF TRAFFIC                        MAI02500
      WRITE(OUT,280) LINK(I,J,INS)                                       MAI02510
  280 FORMAT(///,20X,'INPUT DATA FOR LINK',I5,/)                         MAI02520
      WRITE(OUT,290) X1(L),Y1(L),X2(L),Y2(L)                             MAI02530
  290 FORMAT (10X,'X1 =',F8.3,5X,'Y1 =',F8.3,5X,'X2 =',F8.3,            MAI02540
     15X,'Y2 =',F8.3,1X,'KM')                                            MAI02550
      WRITE(OUT,300) NL(L)                                               MAI02560
  300 FORMAT (/,10X,'NUMBER OF LANES =',I3)                              MAI02570
      NLP=NL(L)                                                          MAI02580
      DO 320 LANE=1,NLP                                                  MAI02590
      WRITE(OUT,310) L,LANE,VFRACT(LANE,L)                               MAI02600
  310 FORMAT (/,10X,'FRACTION OF LINK',I3,1X,'VOLUME ON LANE',I3,        MAI02610
     11X,'=',F5.2)                                                       MAI02620
  320 CONTINUE                                                           MAI02630
      WRITE(OUT,330) WLINK(L),HLINK(L)                                   MAI02640
  330 FORMAT (/,10X,'LINK WIDTH =',F7.2,1X,'METERS',                     MAI02650
     110X,'EMISSION HEIGHT =',F5.2,1X,'METERS')                          MAI02660
      IF(ICUT(L).EQ.0) GO TO 350                                         MAI02670
      WRITE(OUT,340) WIDTC(L)                                            MAI02680
  340 FORMAT(/,10X,'LINK IS A CUT SECTION-WIDTH AT THE TOP=',            MAI02690
     &F7.2,1X,'METERS')                                                  MAI02700
      GO TO 358                                                          MAI02710
  350 WRITE(OUT,355)                                                     MAI02720
  355 FORMAT(/,10X,'LINK IS AT GRADE')                                   MAI02730
  358 CONTINUE                                                           MAI02740
      WRITE(OUT,260) CS(I,J,INS),VOL(I,J,INS),VIN(I,J,INS),              MAI02750
     1VOUT(I,J,INS),AIN(I,J,INS),AOUT(I,J,INS)                           MAI02760
  260 FORMAT (/,10X,'CAPACITY =',F7.1,' VECHICLES/HOUR',5X,              MAI02770
     1'VOLUME =',F7.1,' VECHICLES/HOUR',/10X,'SPEED INTO INTERSECTION ='MAI02780
     2,F5.1,' MI/HR',5X,'SPEED OUT OF INTERSECTION =',F5.1,              MAI02790
     3' MI/HR',/,10X,'ACCELERATION INTO INTERSECTION =',F6.2,            MAI02800
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     4' MI/HR/SEC',5X,'ACCELERATION OUT OF INTERSECTION =',F6.2,          MAI02810
     5' MI/HR/SEC',/)                                                    MAI02820
                                                                         MAI02830
  11 CONTINUE                                                            MAI02840
     WRITE(OUT,591)                                                      MAI02850
  50 CONTINUE                                                            MAI02860
     NLNAI=8+(NINSEC-1)*6-L                                              MAI02870
     NLK=L                                                               MAI02880
     WRITE(OUT,591)                                                      MAI02890
     WRITE(OUT,275)                                                      MAI02900
 275 FORMAT(/,1X,'THE FOLLOWING DATA APPLIES TO THOSE LINKS WHICH DO NOMAI02900
    &T APPROACH ANY INTERSECTION',/)                                     MAI02910
                                                                         MAI02920
C                                                                        MAI02930
C    READ DATA FOR LINKS LEAVING AN INTERSECTION.                        MAI02940
C                                                                        MAI02950
     DO 31 LL=1,NLNAI                                                    MAI02960
     L=L+1                                                               MAI02970
     WRITE(OUT,280) L                                                    MAI02980
     READ(IN,556) X1(L),Y1(L),X2(L),Y2(L),WLINK(L),HLINK(L),             MAI02990
    1ACUT,WIDTC(L)                                                       MAI03000
     ICUT(L)=ACUT+0.001                                                  MAI03010
     READ(IN,556) VOLP(L),VP(L)                                          MAI03020
     READ(IN,556) ANL,(VFRACT(LANE,L),LANE=1,4)                          MAI03030
     NL(L)=ANL+0.001                                                     MAI03040
     WRITE(OUT,290) X1(L),Y1(L),X2(L),Y2(L)                              MAI03050
     WRITE(OUT,330) WLINK(L),HLINK(L)                                    MAI03060
     IF(ICUT(L).EQ.0) GO TO 151                                          MAI03070
     WRITE(OUT,340) WIDTC(L)                                             MAI03080
     GO TO 152                                                           MAI03090
 151 WRITE(OUT,355)                                                      MAI03100
 152 CONTINUE                                                            MAI03110
     WRITE(OUT,300) NL(L)                                                MAI03120
     NLP=NL(L)                                                           MAI03130
     DO 180 LANE=1,NLP                                                   MAI03140
     WRITE(OUT,310) L,LANE,VFPACT(LANE,L)                                MAI03150
 180 CONTINUE                                                            MAI03160
     WRITE(OUT,360) VOLP(L),VP(L)                                        MAI03170
 360 FORMAT(/,10X,'VOLUME=',F10.2,1X,'VEHICLES/HOUR',1X,'SPEED=',        MAI03180
    &F10.2,1X,'MI/HR')                                                   MAI03190
  31 CONTINUE                                                            MAI03200
     NLTOT=L
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      WRITE(OUT,270) NLTOT,NLNAI                                          MAI03210
  270 FORMAT(///,1X,'TOTAL NUMBER OF LINKS IS',I5,/,1X,'OF WHICH',I5,1X,MAI03220
     &'ARE LINKS WHICH DO NOT APPROACH ANY INTERSECTION',/)
C***  INPUT RECEPTOR DATA                                                 MAI03230
      DO 415 IR=1,NREC                                                    MAI03240
      READ(IN,410)  XX(IR),YY(IR),Z(IR),ISTR(IR)                          MAI03250
  410 FORMAT(3F10.0,I10)                                                  MAI03260
      IF(ISTR(IR).EQ.0) GO TO 415                                         MAI03270
      READ(IN,420) NLDUM,(ISTLIN(IR,M),M=1,NLDUM),IRSIDE(IR)              MAI03280
  420 FORMAT(16I5)                                                        MAI03290
      NLKST(IR)=NLDUM                                                     MAI03300
      READ(IN,430)  AST(IR),WST(IR),BUILDH(IR),IPSIDE(IR)                 MAI03310
  430 FORMAT(3F10.0,I10)                                                  MAI03320
  415 CONTINUE                                                            MAI03330
      WRITE(OUT,591)                                                      MAI03340
      DO 500 IR=1,NREC                                                    MAI03350
      WRITE(OUT,435) IR                                                   MAI03360
  435 FORMAT(//,1X,'DATA FOR RECEPTOR',I5,/)                              MAI03370
      WRITE(OUT,440) XX(IR),YY(IR),Z(IR)                                  MAI03380
  440 FORMAT(1X,'XX=',F10.3,1X,'YY=',F10.3,1X,'Z=',F10.2)                 MAI03390
      IF(ISTR(IR).EQ.0) GO TO 500                                         MAI03400
      NLDUM=NLKST(IR)                                                     MAI03410
      WRITE(OUT,450) (ISTLIN(IR,M),M=1,NLDUM)                             MAI03420
  450 FORMAT(1X,'LINKS ADJACENT TO THE STREET CANYON RECEPTOR=',215)      MAI03430
      WRITE(OUT,460) AST(IR),WST(IR),BUILDH(IR)                           MAI03440
  460 FORMAT(1X,'STREET HEADING FROM NORTH=',F10.2,1X,'DEGREES',/,1X,     MAI03450
     &'STREET WIDTH=',F10.2,1X,'METERS',/,1X,'BUILDING HEIGHT=',F10.2,    MAI03460
     &1X,'METERS')                                                        MAI03470
      IF(IRSIDE(IR).EQ.1) WRITE(OUT,465)                                  MAI03480
      IF(IRSIDE(IR).EQ.2) WRITE(OUT,466)                                  MAI03490
  465 FORMAT(1X,'IF ONE FACES TOWARD THE DIRECTION OF THE STREET HEADINGMAI03500
     &',/,1X,'THE RECEPTOR IS ON THE RIGHT SIDE OF THE STREET')           MAI03510
  466 FORMAT(1X,'IF ONE FACES TOWARD THE DIRECTION OF THE STREET HEADINGMAI03520
     &',/,1X,'THE RECEPTOR IS ON THE LEFT SIDE OF THE STREET')            MAI03530
  500 CONTINUE                                                            MAI03540
      WRITE(OUT,65)                                                       MAI03550
   65 FORMAT(//)                                                          MAI03560
C***  INPUT HOURLY METEOROLOGICAL DATA                                    MAI03570
      WRITE(OUT,591)                                                      MAI03580
      DO 550 K=1,NHOURS                                                   MAI03590
                                                                          MAI03600
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      READ(IN,510) THETA(K),U(K),HL(K),KST(K),TEMPF(K),FHOT(K),FCOLD(K)  MAI03610
                                                                         MAI03620
  510 FORMAT(3F10.0,I10,3F10.0)                                          MAI03630
      WRITE(OUT,520) K,THETA(K),U(K),HL(K),KST(K),                       MAI03640
     1TEMPF(K),FHOT(K),FCOLD(K)                                          MAI03650
  520 FORMAT(///,1X,'METEOROLOGICAL INPUTS FOR HOUR',I5,/,               MAI03660
     &1X,'WIND DIRECTION',F10.2,1X,'DEGREES',/,1X,'WIND SPEED=',         MAI03670
     &F10.2,1X,'METERS/SEC',/,1X,'MIXING HEIGHT=',F10.2,1X,              MAI03680
     &'METERS',/,1X,'STABILITY CLASS=',I3,                               MAI03690
     &/,1X,'TEMPERATURE =',F5.1,/,1X,'HOT STARTS =',F5.2,                MAI03700
     &5X,'COLD STARTS =',F5.2)                                           MAI03710
  550 CONTINUE                                                           MAI03720
      WRITE(OUT,65)                                                      MAI03730
C***  INPUT HOURLY RATIOS OF VOLUME TO AVERAGE VOLUME                    MAI03740
      READ(IN,556) (FAC(K),K=1,NHOURS)                                   MAI03750
      WRITE(OUT,570)                                                     MAI03760
  570 FORMAT(//,10X,'HOURLY RATIOS OF VOLUME TO AVERAGE VOLUME',/)       MAI03770
      WRITE(OUT,580) (FAC(K),K=1,NHOURS)                                 MAI03780
  580 FORMAT(1X,8F10.2)                                                  MAI03790
C                                                                        MAI03800
C     READ YEAR, REGION, MODAL SPLIT, ALH.. TRK..  AND IM SPECIFICATIONS MAI03810
C                                                                        MAI03820
      READ(IN,565) NYEAR,IREG,(MS(I),I=1,6),                             MAI03830
     &             ALHFLG,AC,(XLOAD(I),I=1,3),TRAILR,ABSHUM,             MAI03840
     &             TRKFLG,HGWGT,HDWGT,HGCID,HDCID,                       MAI03850
     &             IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2               MAI03860
  565 FORMAT(2I5,6F10.0/I5,6F10.0/I5,4F10.0/6I5)                         MAI03870
      WRITE(OUT,566) NYEAR,IREG,(MS(I),I=1,6)                            MAI03880
  566 FORMAT(/,5X,I5,5X,'REGION=',I2,' MODAL SPLIT=',6(F4.2,',',))       MAI03890
      IF(ALHFLG.EQ.1) WRITE(OUT,567) AC,(XLOAD(I),I=1,3),TRAILR,ABSHUM   MAI03900
  567 FORMAT(' ALH PARAMETERS=',6F10.2)                                  MAI03910
      IF (TRKFLG.EQ.1) WRITE(OUT,568) HGWGT,HDWGT,HGCID,HDCID            MAI03920
  568 FORMAT(' TRK PARAMETERS=',4F10.2)                                  MAI03930
      IF(IMFLG.EQ.1) WRITE(OUT,569) ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2    MAI03940
  569 FORMAT(' IM PARAMETERS=',5I10)                                     MAI03950
C                                                                        MAI03960
      WRITE(OUT,65)                                                      MAI03970
  590 CONTINUE                                                           MAI03980
C***  CALCULATE HOURLY TRAFFIC VOLUMES                                   MAI03990
      WRITE(OUT,591)                                                     MAI04000
  591 FORMAT(1H1,//)
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      DO 600 K=1,NHOURS                                                  MAI04010
      DO 600 INS=1,NINSEC                                                MAI04020
      NPH=NPHASE(INS)                                                    MAI04030
      DO 600 J=1,NPH                                                     MAI04040
      DO 600 I=1,2                                                       MAI04050
      VOLHR(I,J,INS,K)=VOL(I,J,INS)*FAC(K)                               MAI04060
  600 CONTINUE                                                           MAI04070
C                                                                        MAI04080
C                                                                        MAI04090
C     BEGIN LOOP ON HOURS                                                MAI04100
C                                                                        MAI04110
C                                                                        MAI04120
      IYR10=77                                                           MAI04130
      IREG10=1                                                           MAI04140
      STABL1=75.                                                         MAI04150
      STABL2=0.0                                                         MAI04160
      STABL3=0.0                                                         MAI04170
      STABL4=0.0                                                         MAI04180
      STABL5(1)=1.0                                                      MAI04190
      DO 601 JJ=2,6                                                      MAI04200
  601 STABL5(JJ)=0.0                                                     MAI04210
      STABL6=0                                                           MAI04220
      STABL8=0                                                           MAI04230
      STABL7=0                                                           MAI04240
      INIFLG=1                                                           MAI04250
C                                                                        MAI04260
      DO 2000 K=1,NHOURS                                                 MAI04270
      PCCC=FCOLD(K)                                                      MAI04280
C***  CALCULATE(FOR THOSE LINKS APPROACHING INTERSECTIONS) EMISSION      MAI04290
C***  RATES FOR DECELERATION(GM/VEHICLE),ACCELERATION(GM/VEHICLE),       MAI04300
C***  CRUSING(GM/VEHICLE/SEC) AND IDLING(GM/VEHICLE/SEC)                MAI04310
      WRITE(OUT,65)                                                      MAI04320
      SPED=5.0                                                           MAI04330
      CALL SUP8(INIFLG,IREG,NYEAR,SPED,TEMPF(K),FCOLD(K),FHOT(K),PCCC,   MAI04340
     &          MS,ALHFLG,AC,XLOAD,TRAILR,ABSHUM,TRKFLG,HGWGT,HDWGT,     MAI04350
     &         HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,      MAI04360
     &          IPRSW4,EMCZ5,EMIDLE)                                     MAI04370
      IF(IMFLG.EQ.0) GO TO 609                                           MAI04380
      CALL SUP8(0,IREG,NYEAR,SPED,STABL1,STABL2,STABL3,                  MAI04390
     *STABL4,STABL5,STABL6,AC,XLOAD,TRAILR,ABSHUM,STABL7,                MAI04400
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     *HGWGT,HDWGT,HGCID,HDCID,STABL8,ICYIM,ISTRIN,                    MAI04410
     *IMTFLG,MODYR1,MODYR2,IPRSW4,STABCZ,STABID)                      MAI04420
      EMIDLE=STABID*EMCZ5/STABCZ                                      MAI04430
      WRITE(OUT,6099)                                                 MAI04440
 6099 FORMAT(' CAUTION: IM,TRUCK,OR ALH CORRECTION CALLED FOR',/      MAI04450
     *  ' IDLE EMISSIONS CALCULATED BY ALTERNATE METHOD')             MAI04460
  609 CONTINUE                                                        MAI04470
      EMIDLE=EMIDLE/60.0                                              MAI04480
      IF(INIFLG.EQ.1) CALL INITMM                                     MAI04490
      INIFLG=0                                                        MAI04500
      IF(IPRSW1.GE.1)                                                 MAI04510
     1WRITE(OUT,610) EMIDLE                                           MAI04520
  610 FORMAT(1X,'IDLING EMISSIONS=',E15.4,1X,'GM/VEHICLE/SEC',/)      MAI04530
      DO 700 INS=1,NINSEC                                             MAI04540
      NPH=NPHASE(INS)                                                 MAI04550
      DO 700 J=1,NPH                                                  MAI04560
      DO 700 I=1,2                                                    MAI04570
      CALL ACDC(VIN(I,J,INS),AIN(I,J,INS),EMAIN(I,J,INS),             MAI04580
     1IPRSW2)                                                         MAI04590
      SPED=VIN(I,J,INS)*0.5                                           MAI04600
      IF (SPED.LT.5.0) SPED=5.0                                       MAI04610
      CALL SUP8(INIFLG,IREG,NYEAR,SPED,TEMPF(K),FCOLD(K),FHOT(K),PCCC,MAI04620
     &          MS,ALHFLG,AC,XLOAD,TRAILR,ABSHUM,TRKFLG,HGWGT,HDWGT,   MAI04630
     &          HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,   MAI04640
     &          IPRSW4,SCENCZ,SCENID)                                  MAI04650
      CALL SUP8(INIFLG,IREG10,IYR10,SPED,STABL1,STABL2,STABL3,STABL4, MAI04660
     &          STABL5,STABL6,AC,XLOAD,TRAILR,ABSHUM,STABL7,HGWGT,HDWGT,MAI04670
     &          HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,   MAI04680
     &          IPRSW4,STABCZ,STABID)                                  MAI04690
      EMAIN(I,J,INS)=EMAIN(I,J,INS)*SCENCZ/STABCZ                     MAI04700
      IF(IPRSW1.GE.1)                                                 MAI04710
     1WRITE(OUT,620) INS,J,I,EMAIN(I,J,INS)                           MAI04720
  620 FORMAT(1X,'DECELERATION EMISSIONS FOR INTERSECTION',            MAI04730
     &I5,1X,'PHASE',I5,1X,'APPROACH',I5,1X,'=',E15.4,1X,              MAI04740
     &'GM/VEHICLE')                                                   MAI04750
      CALL ACDC(VOUT(I,J,INS),AOUT(I,J,INS),EMAOUT(I,J,INS),          MAI04760
     1IPRSW2)                                                         MAI04770
      SPED=VOUT(I,J,INS)*0.5                                          MAI04780
      IF (SPED.LT.5.0) SPED=5.0                                       MAI04790
      CALL SUP8(INIFLG,IREG,NYEAR,SPED,TEMPF(K),FCOLD(K),FHOT(K),PCCC, MAI04800
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     &           MS,ALHFLG,AC,XLOAD,TRAILR,ABSHUM,TRKFLG,HGWGT,HDWGT,     MAI04810
     &          HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,      MAI04820
     &          IPRSW4,SCENCZ,SCENID)                                     MAI04830
      CALL SUP8(INIFLG,IREG10,IYR10,SPED,STABL1,STABL2,STABL3,STABL4,     MAI04840
     &           STABL5,STABL6,AC,XLOAD,TRAILR,ABSHUM,STABL7,HGWGT,HDWGT,MAI04850
     &          HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,      MAI04660
     &          IPRSW4,STABCZ,STABID)                                     MAI04870
      EMAOUT(I,J,INS)=EMAOUT(I,J,INS)*SCENCZ/STABCZ                       MAI04880
      IF(IPRSW1.GE.1)                                                     MAI04890
     1WRITE(OUT,630) INS,J,I,EMAOUT(I,J,INS)                              MAI04900
  630 FORMAT(1X,'ACCELERATION EMISSIONS FOR INTERSECTION',                MAI04910
     &I5,1X,'PHASE',I5,1X,'APPROACH',I5,1X,'=',E15.4,1X,                  MAI04920
     &'GM/VEHICLE')                                                       MAI04930
      CALL CRUZ(VIN(I,J,INS),EMCRUZ(I,J,INS))                             MAI04940
      SPED=VIN(I,J,INS)                                                   MAI04950
      CALL SUP8(INIFLG,IREG,NYEAR,SPED,TEMPF(K),FCOLD(K),FHOT(K),PCCC,    MAI04960
     &           MS,ALHFLG,AC,XLOAD,TRAILR,ABSHUM,TRKFLG,HGWGT,HDWGT,     MAI04970
     &          HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,      MAI04980
     &          IPRSW4,SCENCZ,SCENID)                                     MAI04990
      CALL SUP8(INIFLG,IREG10,IYR10,SPED,STABL1,STABL2,STABL3,STABL4,     MAI05000
     &           STABL5,STABL6,AC,XLOAD,TRAILR,ABSHUM,STABL7,HGWGT,HDWGT,MAI05010
     &          HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,      MAI05020
     &          IPRSW4,STABCZ,STABID)                                     MAI05030
      EMCRUZ(I,J,INS)=EMCRUZ(I,J,INS)*SCENCZ/STABCZ                       MAI05040
      IF(IPRSW1.GE.1)                                                     MAI05050
     1WRITE(OUT,640) INS,J,I,EMCRUZ(I,J,INS)                              MAI05060
  640 FORMAT(1X,'CRUISE EMISSIONS FOR INTERSECTION',I5,1X,                MAI05070
     &'PHASE',I5,1X,'APPROACH',I5,1X,'=',E15.4,1X,'GM/VEHICLE/SEC')       MAI05080
  700 CONTINUE                                                            MAI05090
      WRITE(OUT,65)                                                       MAI05100
C***  CALCULATE CRUISE EMISSION RATES(GM/VEHICLE/SEC) FOR THOSE           MAI05110
C***  LINKS NOT APPROACHING INTERSECTIONS                                 MAI05120
      NLKP1=NLK+1                                                         MAI05130
      DO 705 L=NLKP1,NLTOT                                                MAI05140
      CALL CRUZ(VP(L),EMCRNI(L))                                          MAI05150
      SPED=VP(L)                                                          MAI05160
      CALL SUP8(INIFLG,IREG,NYEAR,SPED,TEMPF(K),FCOLD(K),FHOT(K),PCCC,    MAI05170
     &           MS,ALHFLG,AC,XLOAD,TRAILR,ABSHUM,TRKFLG,HGWGT,HDWGT,     MAI05180
     &          HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,      MAI05190
     &          IPRSW4,SCENCZ,SCENID)                                     MAI05200
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      CALL SUP8(INIFLG,IPEG10,IYR10,SPED,STABL1,STABL2,STABL3,STABL4,    MAI05210
     &          STABL5,STAPL6,AC,XLOAD,TRAILP,ABSHUM,STAPL7,HGWGT,HDWGT,MAI05220
     &         HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,      MAI05230
     &         IPRSW4,STABCZ,STABID)                                     MAI05240
      EMCRNI(L)=EMCRNI(L)*SCENCZ/STABCZ                                  MAI05250
      IF(IPRSW1.GE.1)                                                    MAI05260
     1WRITE(OUT,708) L,EMCRNI(L)                                         MAI05270
  708 FORMAT(1X,'FOR LINK',I5,1X,'(NOT APPROACHING AN INTERSECTION)---CRMAI05280
     &UISE EMISSION RATE=',E15.4,1X,'GM/VEHICLE/SEC')                    MAI05290
  705 CONTINUE                                                           MAI05300
C***  CALCULATE QUEUE LENGTHS AND DELAY TIMES                           MAI05310
C     DIVIDE LINK VOLUMES BY THE NUMBER OF LANES IN THE LINK.           MAI05320
      L=0                                                                MAI05330
      DO 710 INS=1,NINSEC                                                MAI05340
      NPH=NPHASE(INS)                                                    MAI05350
      DO 710 J=1,NPH                                                     MAI05360
      DO 710 I=1,2                                                       MAI05370
      L=L+1                                                              MAI05380
      LNP=NL(L)                                                          MAI05390
      VOL(I,J,INS)=VOLHR(I,J,INS,K)/LNP                                  MAI05400
  710 CONTINUE                                                           MAI05410
      CALL TRAFIC(NPHM,VOL,CS,ISIG,QLENTH,DELAY,NINSEC,NPHASE,GAP,       MAI05420
     1LINK,NQND,CY,G)                                                    MAI05430
      IF(IPRSW1.LT.1) GO TO 703                                          MAI05440
      DO 714 INS=1,NINSEC                                                MAI05450
      NPH=NPHASE(INS)                                                    MAI05460
      DO 713 J=1,NPH                                                     MAI05470
      DO 712 I=1,2                                                       MAI05480
      IF(IPRSW3.NE.1) GO TO 4005                                         MAI05490
C********REDEFINE QUEUE LENGHT & DELAY                                   MAI05500
      READ(5,4000)  QLENTH(I,J,INS),DELAY(I,J,INS)                       MAI05510
 4000 FORMAT(2F10.0)                                                     MAI05520
 4005 LOUT=LINK(I,J,INS)                                                 MAI05530
      WRITE(OUT,711) I,J,INS,VOL(I,J,INS),CS(I,J,INS),ISIG(INS),         MAI05540
     &QLENTH(I,J,INS),DELAY(I,J,INS),NPHASE(INS),GAP(INS),               MAI05550
     &LINK(I,J,INS),NQND(LOUT),CY(INS),G(INS,J)                          MAI05560
  711 FORMAT(1X,'I=',I5,1X,'J=',I5,1X,'INS=',I5,1X,                      MAI05570
     &'VOL=',E15.4,1X,'CS=',E15.4,1X,'ISIG=',I5,/,                       MAI05580
     &1X,'QLENTH=',E15.4,1X,'DELAY=',E15.4,1X,'NPHASE=',I5,/,            MAI05590
     &1X,'GAP=',F10.1,1X,'LINK=',I5,1X,'NQND=',I5,1X,                    MAI05600
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     &'CY=',F10.2,1X,'G=',F10.2)                                          MAI05610
  712 CONTINUE                                                            MAI05620
  713 CONTINUE                                                            MAI05630
  714 CONTINUE                                                            MAI05640
C     RECALCULATE LINK VOLUMES.                                           MAI05650
  703 DO 702 INS=1,NINSEC                                                 MAI05660
      NPH=NPHASE(INS)                                                     MAI05670
      DO 702 J=1,NPH                                                      MAI05680
      DO 702 I=1,2                                                        MAI05690
      VOL(I,J,INS)=VOLHR(I,J,INS,K)                                       MAI05700
  702 CONTINUE                                                            MAI05710
C***  CONSTRUCT PSEUDOLINKS(LINK WITH A LENGTH EQUAL TO AN AVERAGE QUEUE  MAI05720
C***  LENGTH ON THE PHYSICAL LINK)                                        MAI05730
C***  AND CALCULATE EMISSION RATES (GM/M/SEC) FOR ALL OF THOSE            MAI05740
C***  LINKS AND PSEUDOLINKS WHICH APPROACH INTERSECTIONS                  MAI05750
      WRITE(OUT,65)                                                       MAI05760
      DO 750 INS=1,NINSEC                                                 MAI05770
      NPH=NPHASE(INS)                                                     MAI05780
      DO 750 J=1,NPH                                                      MAI05790
      DO 750 I=1,2                                                        MAI05800
      LK=LINK(I,J,INS)                                                    MAI05810
      DIS=SQRT((X2(LK)-X1(LK))**2+(Y2(LK)-Y1(LK))**2)                     MAI05820
      DIS=1000.*DIS                                                       MAI05830
      QQQ=QLENTH(I,J,INS)                                                 MAI05840
      IF(QLENTH(I,J,INS).GT.DIS) GO TO 5030                               MAI05850
      IF(QLENTH(I,J,INS).LT.1.0) QLENTH(I,J,INS)=1.0                      MAI05860
      IF(ISIG(INS).EQ.0) QQQ=8.*VOL(I,J,INS)                              MAI05870
      QLN=0.5*(VIN(I,J,INS)**2./(-AIN(I,J,INS))+                          MAI05880
     .VOUT(I,J,INS)**2./AOUT(I,J,INS))*0.4694                             MAI05890
      IF(QLN.GT.DIS) QLN=DIS                                              MAI05900
      IF(QLENTH(I,J,INS).LT.1.0) QLENTH(I,J,INS)=1.0                      MAI05910
      XCES=IFREE(INS)*(EMAIN(I,J,INS)+EMAOUT(I,J,INS)-                    MAI05920
     .EMCRUZ(I,J,INS)*0.5*(-VIN(I,J,INS)/AIN(I,J,INS)+                    MAI05930
     .VOUT(I,J,INS)/AOUT(I,J,INS)))*(QQQ/8.0)/CY(INS)                     MAI05940
      TILDE=IFREE(INS)*EMIDLE*DELAY(I,J,INS)*VOL(I,J,INS)/3600.           MAI05950
      IF(XCES.GT.TILDE) QLENTH(I,J,INS)=QLN                               MAI05960
      RATIO=QLENTH(I,J,INS)/DIS                                           MAI05970
      IF(IPRSW1.GT.1)                                                     MAI05980
     1WRITE(OUT,715) I,J,INS,QLENTH(I,J,INS),DIS,RATIO                    MAI05990
  715 FORMAT(1X,'I=',I5,1X,'J=',I5,1X,'INS=',I5,1X,'QLENTH=',E15.4,1X,    MAI06000
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     &'DIS=',E15.4,1X,'RATIO=',E15.4)                                    MAI06010
      DIST1=(X1(LK)-XC(INS))**2+(Y1(LK)-YC(INS))**2                      MAI06020
      DIST2=(X2(LK)-XC(INS))**2+(Y2(LK)-YC(INS))**2                      MAI06030
      IF(DIST1.GT.DIST2) GO TO 716                                       MAI06040
      X1(LK+NLTOT)=X1(LK)                                                MAI06050
      Y1(LK+NLTOT)=Y1(LK)                                                MAI06060
      X2(LK+NLTOT)=X1(LK)+RATIO*(X2(LK)-X1(LK))                          MAI06070
      Y2(LK+NLTOT)=Y1(LK)+RATIO*(Y2(LK)-Y1(LK))                          MAI06080
      GO TO 717                                                          MAI06090
  716 X1(LK+NLTOT)=X2(LK)-RATIO*(X2(LK)-X1(LK))                          MAI06100
      Y1(LK+NLTOT)=Y2(LK)-RATIO*(Y2(LK)-Y1(LK))                          MAI06110
      X2(LK+NLTOT)=X2(LK)                                                MAI06120
      Y2(LK+NLTOT)=Y2(LK)                                                MAI06130
  717 CONTINUE                                                           MAI06140
      NL(LK+NLTOT)=NL(LK)                                                MAI06150
      NLKP=NL(LK)                                                        MAI06160
      WLINK(LK+NLTOT)=WLINK(LK)                                          MAI06170
      HLINK(LK+NLTOT)=HLINK(LK)                                          MAI06180
      ICUT(LK+NLTOT)=ICUT(LK)                                            MAI06190
      WIDTC(LK+NLTOT)=WIDTC(LK)                                          MAI06200
      EMLNP(LK)=(EMCRUZ(I,J,INS)*VOL(I,J,INS)/3600.)/                    MAI06210
     &(VIN(I,J,INS)*1609.344/3600.)                                      MAI06220
      EMLNP(LK+NLTOT)=(XCES+TILDE)/QLENTH(I,J,INS)                       MAI06230
      DO 730 LANE=1,NLKP                                                 MAI06240
      EMLN(LK,LANE)=EMLNP(LK)*VFRACT(LANE,LK)                            MAI06250
      EMLN(LK+NLTOT,LANE)=EMLNP(LK+NLTOT)*VFRACT(LANE,LK)                MAI06260
      IF(IPRSW1.GE.1)                                                    MAI06270
     1WRITE(OUT,725) INS,J,I,LK,LANE,EMLN(LK,LANE)                       MAI06280
  725 FORMAT(1X,'INTERSECTION=',I5,1X,'PHASE=',I5,1X,                    MAI06290
     &'APPROACH=',I5,1X,'LINK=',I5,1X,'LANE=',I5,/,1X,                   MAI06300
     &'EMISSION RATE=',E15.4,1X,'GM/METER/SEC')                          MAI06310
      LKP=LK+NLTOT                                                       MAI06320
      IF(IPRSW1.GE.1)                                                    MAI06330
     1WRITE(OUT,727) INS,J,I,LKP,LANE,EMLN(LKP,LANE)                     MAI06340
  727 FORMAT(1X,'INTERSECTION=',I5,1X,'PHASE=',I5,1X,                    MAI06350
     &'APPROACH=',I5,1X,'LINK(PSEUDOLINK)=',I5,1X,'LANE=',I5,/,1X,       MAI06360
     &'EMISSION RATE=',E15.4,1X,'GM/METER/SEC')                          MAI06370
  730 CONTINUE                                                           MAI06380
  750 CONTINUE                                                           MAI06390
      WRITE(OUT,65)                                                      MAI06400
```

```
      DO 800 L=NLKP1,NLTOT                                                    MAI06410
      NLKP=NL(L)                                                              MAI06420
      DO 800 LANE=1,NLKP                                                      MAI06430
      EMLN(L,LANE)=VFRACT(LANE,L)*EMCRNI(L)*(VOLP(L)*FAC(K)/                  MAI06440
     &3600.)/(VP(L)*1609.344/3600.)                                           MAI06450
      IF(IPRSW1.GE.1)                                                         MAI06460
     1WRITE(OUT,775) L,LANE,EMLN(L,LANE)                                      MAI06470
  775 FORMAT(1X,'LINK(NOT APPROACHING INTERSECTION)=',I5,1X,                  MAI06480
     &'LANE=',I5,1X,'EMISSION RATE=',E15.4,1X,'GM/METER/SEC')                 MAI06490
  800 CONTINUE                                                                MAI06500
      NLTOTT=NLTOT+NLK                                                        MAI06510
C***  SELECT STREET CANYON RECEPTORS FOR HOUR K THROUGH APPLICATION           MAI06520
C***  OF THE STREET CANYON DECISION MODEL                                     MAI06530
      DO 900 IR=1,NREC                                                        MAI06540
      IF(ISTR(IR).EQ.0) GO TO 900                                             MAI06550
      KSTK=KST(K)                                                             MAI06560
      DELTA=7.0*SQRT(RK(KSTK)*WST(IR)/U(K))                                   MAI06570
      IF(DELTA.GT.BUILDH(IR)) GO TO 850                                       MAI06580
      ISTRH(IR)=1                                                             MAI06590
      GO TO 900                                                               MAI06600
  850 ISTRH(IR)=0                                                             MAI06610
  900 CONTINUE                                                                MAI06620
      GS=1.0                                                                  MAI06630
      XKST=KST(K)                                                             MAI06640
      CNTR=0.                                                                 MAI06650
      DO 1000 L=1,NLTOTT                                                      MAI06660
      XNL=NL(L)                                                               MAI06670
      CUT=ICUT(L)                                                             MAI06680
      NLKP=NL(L)                                                              MAI06690
      DO 910 LANE=1,NLKP                                                      MAI06700
      EMLNP(LANE)=EMLN(L,LANE)                                                MAI06710
  910 CONTINUE                                                                MAI06720
      LP=L-NLTOT                                                              MAI06730
      IF(LP.LT.1) GO TO 912                                                   MAI06740
      IF(NQND(LP).EQ.1) GO TO 1000                                            MAI06750
  912 CONTINUE                                                                MAI06760
      WRITE(OUT,920) L                                                        MAI06770
  920 FORMAT (//,13X,'CONTRIBUTION FROM LINK',I3)                             MAI06780
      CALL PTHWY(X1(L),Y1(L),X2(L),Y2(L),HLINK(L),                            MAI06790
     &WLINK(L),CNTR,XNL,EMLNP,CUT,WIDTC(L),THETA(K),                          MAI06800
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     &U(K),HL(K),XKST,GS,NREC,XX,YY,Z,C,IPRSW)                          MAI06810
      DO 975 IR=1,NREC                                                  MAI06820
      IF(ISTR(IR).EQ.0) GO TO 940                                       MAI06830
      NLKSTP=NLKST(IR)                                                  MAI06840
      IF(ISTRH(IR).NE.1) GO TO 940                                      MAI06850
      SIGN=1.0                                                          MAI06860
      IF(IRSIDE(IR).NE.1) SIGN=-1.0                                     MAI06870
      WLN=WLINK(L)/NLKP                                                 MAI06880
      XX1=X1(L)-XX(IR)                                                  MAI06890
      YY1=Y1(L)-YY(IR)                                                  MAI06900
      XX2=X1(L)-X2(L)                                                   MAI06910
      YY2=Y1(L)-Y2(L)                                                   MAI06920
      A=SQRT(XX1*XX1+YY1*YY1)                                           MAI06930
      B=SQRT(XX2*XX2+YY2*YY2)                                           MAI06940
      CCS=(XX1*YY2-XX2*YY1)/(A*B)                                       MAI06950
      XLL=ABS(A*CCS*1000.0)+(WLINK(L)/2.0-0.5*WLN)*SIGN                 MAI06960
      THETPP=ASIN(CCS)*57.296                                           MAI06970
      IF(IPRSW1.GE.1)                                                   MAI06980
     1WRITE(6,9030) XLL,THETPP                                          MAI06990
 9030 FORMAT (10X,'XLL =',F10.3,10X,'THETPP =',F7.1)                    MAI07000
      DO 955 M=1,NLKSTP                                                 MAI07010
      IF(L.LE.NLTOT.AND.L.EQ.ISTLIN(IR,M)) GO TO 960                    MAI07020
  955 CONTINUE                                                          MAI07030
      GO TO 970                                                         MAI07040
  960 DO 901 LANE=1,NLKP                                                MAI07050
      XL=XLL-(LANE-1)*WLN*SIGN                                          MAI07060
      IF(IPRSW1.GE.1)                                                   MAI07070
     1WRITE(OUT,9030) XL                                                MAI07080
      CALL STREET(EMLNP(LANE),THETA(K),U(K),AST(IR),WST(IR),XL,         MAI07090
     &BUILDH(IR),Z(IR),IRSIDE(IR),CST)                                  MAI07100
      WRITE(OUT,9920) IR,K,CST,L,LANE                                   MAI07110
 9920 FORMAT (/,1X,'STREET CANYON RECEPTOR',I3,5X,'HOUR =',I3,          MAI07120
     15X,'CONCENTRATION =',E12.3,5X,'LINK =',I5,5X,'LANE =',I5)         MAI07130
      CONC(K,IR)=CONC(K,IR)+CST                                         MAI07140
  901 CONTINUE                                                          MAI07150
      GO TO 975                                                         MAI07160
  970 DO 971 M=1,NLKSTP                                                 MAI07170
      IF(LP.EQ.ISTLIN(IR,M)) GO TO 972                                  MAI07180
  971 CONTINUE                                                          MAI07190
      GO TO 940                                                         MAI07200
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C***  DETERMINE WHETHER THE STREET CANYON RECEPTOR IS ADJACENT TO A      MAI07210
C***  QUEUE                                                             MAI07220
  972 CALL DECIDE(XX(IR),YY(IR),X1(L),Y1(L),X2(L),Y2(L),IANS)           MAI07230
      IF(IPRSW1.GE.1)                                                   MAI07240
     1WRITE(OUT,973) IR,L,XX(IR),YY(IR),X1(L),Y1(L),X2(L),Y2(L),IANS    MAI07250
  973 FORMAT(1X,'IR=',I5,1X,'L=',I5,1X,'XX=',F10.3,1X,'YY=',F10.3,1X,   MAI07260
     &'X1=',F10.3,1X,'Y1=',F10.3,1X,'X2=',F10.3,1X,'Y2=',F10.3,1X,'IANS=MAI07270
     &',I5)                                                             MAI07280
      IF(IANS.EQ.0) GO TO 940                                           MAI07290
      DO 911 LANE=1,NLKP                                                MAI07300
      XL=XLL-(LANE-1)*WLN*SIGN                                          MAI07310
      IF(IPRSW1.GE.1)                                                   MAI07320
     1WRITE(OUT,9030) XL                                                MAI07330
      CALL STREET(EMLNP(LANE),THETA(K),U(K),AST(IR),WST(IR),XL,         MAI07340
     &BUILDH(IR),Z(IR),IRSIDE(IR),CST)                                  MAI07350
      WRITE(OUT,9920) IR,K,CST,L,LANE                                   MAI07360
      CONC(K,IR)=CONC(K,IR)+CST                                         MAI07370
  911 CONTINUE                                                          MAI07380
      GO TO 975                                                         MAI07390
  940 CONC(K,IR)=CONC(K,IR)+C(IR)                                       MAI07400
  975 CONTINUE                                                          MAI07410
 1000 CONTINUE                                                          MAI07420
      WRITE(OUT,65)                                                     MAI07430
      FACT=1.0                                                          MAI07440
      DO 1900 IR=1,NREC                                                 MAI07450
      CONC(K,IR)=CONC(K,IR)*0.00087*FACT                                MAI07460
      WRITE(OUT,1010) K,IR,CONC(K,IR)                                   MAI07470
 1010 FORMAT(1X,'CONCENTRATION FOR HOUR',I5,1X,'AT RECEPTOR',I5,1X,     MAI07480
     &'=',E15.4,1X,'PPM')                                               MAI07490
 1900 CONTINUE                                                          MAI07500
      WRITE(OUT,65)                                                     MAI07510
 2000 CONTINUE                                                          MAI07520
      GO TO 8000                                                        MAI07530
C***  ERROR MESSAGES FOR INTERSECTION-MIDBLOCK MODEL                    MAI07540
 5010 WRITE(OUT,5015) INS,J,I,AIN(I,J,INS)                              MAI07550
 5015 FORMAT(///,1X,'POSITIVE APPROACH ACCELERATION',1X,'INS=',I5,1X,   MAI07560
     &'J=',I5,1X,'I=',I5,1X,'AIN=',F10.2)                               MAI07570
      GO TO 8000                                                        MAI07580
 5020 WRITE(OUT,5025) INS,J,I,AOUT(I,J,INS)                             MAI07590
 5025 FORMAT(///,1X,'NEGATIVE DEPARTURE ACCELERATION',1X,'INS=',I5,1X,  MAI07600
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     &'J=',I5,1X,'I=',I5,1X,'AOUT=',F10.2)                              MAI07610
      GO TO 8000                                                        MAI07620
5030 WRITE(OUT,5035) INS,J,I,LK,DIS,QLENTH(I,J,INS)                     MAI07630
5035 FORMAT(///,1X,'QUEUE LENGTH LONGER THAN LINK',/,1X,                MAI07640
     &'INTERSECTION=',I5,1X,'PHASE=',I5,1X,'APPROACH=',I5,1X,           MAI07650
     &'LINK NUMBER =',I5,1X,                                            MAI07660
     &'LINK LENGTH=',E15.3,1X,'QLENTH=',E15.3)                          MAI07670
8000 CONTINUE                                                           MAI07680
     STOP                                                               MAI07690
     END                                                                MAI07700
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      SUBROUTINE INITMM                                                  INT00010
      COMMON/AGEMM/DEC                                                   INT00020
      COMMON/COCOEF/COEF                                                 INT00030
      COMMON/COEFMM/BAD                                                  INT00040
      COMMON/DET/DETER                                                   INT00050
      COMMON/MYMCOM/MYM,MYP,TF                                           INT00060
      REAL MYM(120),MYR(120)                                             INT00070
      REAL DEC(20),TF(20,6),COEF(20,12),BAD(12,20),DETER(20)             INT00080
C                                                                        INT00090
C                                                                        INT00100
C     SET UP ARRAY OF VMT (OR TRAVEL FACTOR) BY MODEL YEAR GROUP         INT00110
C                                                                        INT00120
C                                                                        INT00130
      DEC(20)=TF(20,1)                                                   INT00140
      DEC(19)=TF(19,1)                                                   INT00150
      DEC(18)=TF(18,1)                                                   INT00160
      DEC(17)=TF(17,1)+TF(16,1)                                          INT00170
      DEC(16)=TF(15,1)                                                   INT00180
      DO 5 I=8,15                                                        INT00190
    5 DEC(I)=0.0                                                         INT00200
      DEC(7)=TF(14,1)                                                    INT00210
      DEC(6)=TF(13,1)                                                    INT00220
      DEC(5)=TF(12,1)                                                    INT00230
      DEC(4)=TF(11,1)                                                    INT00240
      DEC(3)=0.0                                                         INT00250
      DEC(2)=0.0                                                         INT00260
      DO 10 I=1,10                                                       INT00270
   10 DEC(2)=DEC(2)+TF(I,1)                                              INT00280
      DEC(1)=0.0                                                         INT00290
C                                                                        INT00300
C                                                                        INT00310
C     DETERIORATE MODAL MODEL COEFFICIENTS TO 1977                       INT00320
C                                                                        INT00330
C                                                                        INT00340
      DO 100 J=1,20                                                      INT00350
      DO 100 K=1,12                                                      INT00360
  100 COEF(J,K)=BAD(K,J)*(1.0+DETER(J))                                  INT00370
      WRITE(6,200)((BAD(IE,I1),IE=1,12),I1=1,20),                        INT00380
     &(DETER(I1),I1=1,20),                                               INT00390
     &(((COEF(I1,IE),IE=1,12),I1=1,20),                                  INT00400
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```
     &(IF(I1.1),I1=1,20),(DEC(I1),I1=1,20)                              INT00410
200  FORMAT (60(1X,4E15.8/),'1',/20(1X,F15.5/),                         INT00420
     &'1'/60(1X,4E15.8/),'1'/20(1X,F15.5/))                             INT00430
      RETURN                                                            INT00440
      END                                                               INT00450
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      SUBROUTINE CRUZ(V,EMCRUZ)                                          CRU00010
      COMMON/AGEMM/DEC                                                   CRU00020
      COMMON/COCOEF/COEF                                                 CRU00030
      DIMENSION COEF(20,12),DEC(20),X(12)                                CRU00040
      FACTOR=1.0                                                         CRU00050
      EMCRUZ=0.                                                          CRU00060
      X(10)=1.                                                           CRU00070
      X(11)=V                                                            CRU00080
      X(12)=V**2                                                         CRU00090
      DO 100 I1=1,20                                                     CRU00100
      IF(DEC(I1).EQ.0.) GO TO 100                                        CRU00110
      DO 50 I2=10,12                                                     CRU00120
      EMCRUZ=EMCRUZ+X(I2)*COEF(I1,I2)*FACTOR*DEC(I1)                     CRU00130
   50 CONTINUE                                                           CRU00140
  100 CONTINUE                                                           CRU00150
      RETURN                                                             CRU00160
      END                                                                CRU00170
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      SUBROUTINE TRAFIC(NP,VOL,CAP,ISIG,QLENTH,DELAY,IN,NPHASE,      TRA00010
     &GAP,LINK,NGND,CY,G)                                            TRA00020
      DIMENSION VOL(2,2,2),CAP(2,2,2),ISIG(1),QLENTH(2,2,2),         TRA00030
     1DELAY(2,2,2),NPHASE(1),GAP(1),G(2,2),LINK(2,2,2),              TRA00040
     2NGND(1),CY(1)                                                  TRA00050
      INTEGER OUT                                                    TRA00060
      OUT=6                                                          TRA00070
      NUM=12+(IN-1)*10                                               TRA00080
      DO 11 J=1,NUM                                                  TRA00090
      NGND(J)=0                                                      TRA00100
   11 CONTINUE                                                       TRA00110
      DO 500 INS=1,IN                                                TRA00120
      IF(ISIG(INS).NE.0) GO TO 200                                   TRA00130
      CY(INS)=3600.                                                  TRA00140
C***  ASSUME ZERO QUEUE LENGTH AND DELAY TIME FOR THE                TRA00150
C***  MAJOR STREET(PHASE). VOL(I=(1,2),1,INS) ARE CONSIDERED VOLUMES TRA00160
C***  FOR THE MAJOR STREET(PHASE)                                    TRA00170
C***  INPUT CAPACITIES ARE NOT USED FOR UNSIGNALIZED INTERSECTIONS   TRA00180
C***  NGND(LK)=1('NO QUEUE,NO DELAY FOR LINK LK')                    TRA00190
      DO 50 I=1,2                                                    TRA00200
      LK=LINK(I,1,INS)                                               TRA00210
      NGND(LK)=1                                                     TRA00220
      QLENTH(I,1,INS)=0.                                             TRA00230
      DELAY(I,1,INS)=0.                                              TRA00240
   50 CONTINUE                                                       TRA00250
      EGAP=GAP(INS)*(VOL(1,1,INS)+VOL(2,1,INS))/3600.                TRA00260
      EGAP=EXP(-EGAP)                                                TRA00270
      C=(VOL(1,1,INS)+VOL(2,1,INS))*EGAP/(1.-EGAP)                   TRA00280
      DO 100 I=1,2                                                   TRA00290
      SKIP=C-VOL(I,2,INS)                                            TRA00300
      IF(SKIP.LE.0.) GO TO 300                                       TRA00310
      QLENTH(I,2,INS)=VOL(I,2,INS)/SKIP                              TRA00320
      QLENTH(I,2,INS)=QLENTH(I,2,INS)*8.                             TRA00330
      DELAY(I,2,INS)=QLENTH(I,2,INS)*3600./C                         TRA00340
  100 CONTINUE                                                       TRA00350
      GO TO 400                                                      TRA00360
  200 NPH=NPHASE(INS)                                                TRA00370
      IF(ISIG(INS).EQ.2) GO TO 295                                   TRA00380
      SKIP=0.                                                        TRA00390
      DO 220 J=1,NPH                                                 TRA00400
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      R1=VOL(1,J,INS)/CAP(1,J,INS)                                      TRA00410
      R2=VOL(2,J,INS)/CAP(2,J,INS)                                      TRA00420
      SKIP=SKIP+AMAX1(R1,R2)                                            TRA00430
  220 CONTINUE                                                          TRA00440
      SKIP=1.-SKIP                                                      TRA00450
      IF(SKIP.LE.0.) GO TO 310                                          TRA00460
      CY(INS)=(9.*NPH+5.)/SKIP                                          TRA00470
  222 CONTINUE                                                          TRA00480
      DO 230 J=1,NPH                                                    TRA00490
      SKIPP=1.-SKIP                                                     TRA00500
      R1=VOL(1,J,INS)/CAP(1,J,INS)                                      TRA00510
      R2=VOL(2,J,INS)/CAP(2,J,INS)                                      TRA00520
      G(INS,J)=CY(INS)*AMAX1(R1,R2)/SKIPP-3.                            TRA00530
  225 CONTINUE                                                          TRA00540
      IF(G(INS,J).LE.0.) GO TO 320                                      TRA00550
  230 CONTINUE                                                          TRA00560
  285 CONTINUE                                                          TRA00570
      DO 270 J=1,NPH                                                    TRA00580
      DO 270 I=1,2                                                      TRA00590
      P=(1.-G(INS,J)/CY(INS))/(1.-VOL(I,J,INS)/CAP(I,J,INS))            TRA00600
      IF(P.LT.0.) GO TO 330                                             TRA00610
      C3=CAP(I,J,INS)*G(INS,J)/CY(INS)                                  TRA00620
      IF(C3.LE.VOL(I,J,INS)) GO TO 340                                  TRA00630
      QLENTH(I,J,INS)=P*VOL(I,J,INS)*CY(INS)/3600.                      TRA00640
     &+VOL(I,J,INS)/(C3-VOL(I,J,INS))                                   TRA00650
      QLENTH(I,J,INS)=QLENTH(I,J,INS)*8.                                TRA00660
      DELAY(I,J,INS)=0.5*P*(CY(INS)-G(INS,J))*3600.*VOL(I,J,INS)/       TRA00670
     &(C3*(C3-VOL(I,J,INS)))                                            TRA00680
  270 CONTINUE                                                          TRA00690
      GO TO 400                                                         TRA00700
  300 WRITE(OUT,305) SKIP,C,I,INS,VOL(I,2,INS)                          TRA00710
  305 FORMAT(//,1X,'***ERROR*** CAPACITY LESS THAN VOLUME FOR AN UNSIGNATRA00720
     &LIZED INTERSECTION',/,1X,'SKIP=',E15.3,1X,                        TRA00730
     &'C=',E15.3,1X,'I=',I5,1X,'INS=',I5,1X,'VOL=',E15.3)               TRA00740
      GO TO 350                                                         TRA00750
  310 WRITE(OUT,315) INS,SKIP                                           TRA00760
  315 FORMAT(//,1X,'***ERROR*** FOR SIGNALIZED INTERSECTION',I5,1X,     TRA00770
     &'SKIP=',E15.3)                                                    TRA00780
      GO TO 350                                                         TRA00790
  320 WRITE(OUT,325) INS,J,G(INS,J)                                     TRA00800
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325 FORMAT(//,1X,'***ERROR*** NEGATIVE GREEN TIME FOR SIGNALIZED INTERTRA00810
   &SECTION',I5,1X,'PHASE=',I5,1X,'G=',E15.3,1X,'SEC')                TRA00820
    GO TO 350                                                         TRA00830
330 WRITE(OUT,335) INS,J,I,P                                          TRA00840
335 FORMAT(//,1X,'***ERROR*** NEGATIVE P VALUE FOR SIGNALIZED INTERSECTRA00850
   &TION',I5,1X,'PHASE=',I5,1X,'APPROACH=',I5,'P=',E15.3)             TRA00860
    GO TO 350                                                         TRA00870
340 WRITE(OUT,345) INS,J,I,C3,VOL(I,J,INS)                            TRA00880
345 FORMAT(//,1X,'***ERROR*** CAPACITY LESS THAN VOLUME FOR SIGNALIZEDTRA00890
   & INTERSECTION',I5,1X,'PHASE=',I5,1X,'APPROACH=',I5,/,             TRA00900
   &1X,'C3=',E15.3,1X,'VEHICLES/HOUR',1X,'VOL=',E15.3,1X,'VEHICLES/HOUTRA00910
   &R')                                                               TRA00920
350 CONTINUE                                                          TRA00930
    STOP                                                              TRA00940
400 CONTINUE                                                          TRA00950
500 CONTINUE                                                          TRA00960
    RETURN                                                            TRA00970
    END                                                               TRA00980
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      SUBROUTINE ACDC(V,A,EMAD,IPRSW)                                    ACD00010
      COMMON/AGEMM/DEC                                                   ACD00020
      COMMON/COCOEF/COEF                                                 ACD00030
      DIMENSION COEF(20,12),DEC(20),X(12)                                ACD00040
      FACTOR=1.0                                                         ACD00050
      EMAD=0.                                                            ACD00060
      AMAX=1.0                                                           ACD00070
      AMIN=-1.2                                                          ACD00080
      A1=-1.0/AMIN                                                       ACD00090
      A2=-1.0/AMAX                                                       ACD00100
      IF(A.EQ.0.) GO TO 200                                              ACD00110
      T=ABS(V/A)                                                         ACD00120
      AA=A*A                                                             ACD00130
      TT=T*T                                                             ACD00140
      X(1)=T                                                             ACD00150
      X(2)=A*TT/2.0                                                      ACD00160
      X(3)=A*T                                                           ACD00170
      X(4)=AA*TT/2.0                                                     ACD00180
      X(5)=AA*TT*T/3.0                                                   ACD00190
      X(6)=AA*T                                                          ACD00200
      X(8)=AA*A*TT*T/3.0                                                 ACD00210
      X(7)=AA*A*TT/2.0                                                   ACD00220
      X(9)=AA*AA*TT*T/3.0                                                ACD00230
      X(10)=X(1)                                                         ACD00240
      X(11)=X(2)                                                         ACD00250
      X(12)=X(5)                                                         ACD00260
      IF(A.GE.AMAX) HOA=0.                                               ACD00270
      IF(A.LE.AMIN) HOA=0.                                               ACD00280
      IF(A.GE.0.0.AND.A.LT.AMAX) HOA=(A2*A)+1.0                          ACD00290
      IF(A.LE.0.0.AND.A.GT.AMIN) HOA=(A1*A)+1.0                          ACD00300
      SOA=1.-HOA                                                         ACD00310
      IF(IPRSW.GE.1) WRITE(6,9010) X,SOA,HOA                             ACD00320
 9010 FORMAT (5X,'X(I) =',12F8.2,/,5X,'SOA =',F5.1,10X,'HOA =',F5.1)     ACD00330
      DO 100 I1=1,20                                                     ACD00340
      IF(DEC(I1).EQ.0.) GO TO 100                                        ACD00350
      DO 70 I2=1,9                                                       ACD00360
      IF(A.LT.0.0.AND.I2.EQ.2) GO TO 50                                  ACD00370
      IF(A.LT.0.0.AND.I2.EQ.4) GO TO 50                                  ACD00380
      IF(A.LT.0.0.AND.I2.EQ.7) GO TO 50                                  ACD00390
      EMAD=EMAD+X(I2)*SOA*COEF(I1,I2)*FACTOR*DEC(I1)                     ACD00400
```

```
      GO TO 65                                                          ACD00410
   50 EMAD=EMAD-X(I2)*SOA*COEF(I1,I2)*FACTOR*DEC(I1)                    ACD00420
   65 IF(IPRSW.GE.1) WRITE(6,9020) EMAD,I1,I2                           ACD00430
 9020 FORMAT (10X,'EMAD =',F12.3,2I5)                                   ACD00440
   70 CONTINUE                                                          ACD00450
      DO 80 I2=10,12                                                    ACD00460
      IF(A.LT.0.0.AND.I2.EQ.11) GO TO 75                                ACD00470
      EMAD=EMAD+X(I2)*HOA*COEF(I1,I2)*FACTOR*DEC(I1)                    ACD00480
      GO TO 80                                                          ACD00490
   75 EMAD=EMAD-X(I2)*HOA*COEF(I1,I2)*FACTOR*DEC(I1)                    ACD00500
   80 CONTINUE                                                          ACD00510
  100 CONTINUE                                                          ACD00520
      GO TO 250                                                         ACD00530
  200 EMAD=0.                                                           ACD00540
  250 CONTINUE                                                          ACD00550
      RETURN                                                            ACD00560
      END                                                               ACD00570
```

```
      SUBROUTINE STREET(E,THETA,WS,AST,W,X,BHT,RHT,IRS,CST)                STR00010
      CK=7.0                                                               STR00020
      XLO=2.0                                                              STR00030
      CW=CK*E*(BHT-RHT)*1.0E6/(W*(WS+0.5)*BHT)                             STR00040
      CL=CK*E*1.0E6/((WS+0.5)*(SQRT((X)**2+RHT**2)+XLO))                   STR00050
      EPSIL=THETA-AST                                                      STR00060
      IF(EPSIL.LT.0.) EPSIL=360.+EPSIL                                     STR00070
      IF(EPSIL.GT.30..AND.EPSIL.LE.150..AND.IRS.EQ.1) GO TO 50             STR00080
      IF(EPSIL.GT.30..AND.EPSIL.LE.150..AND.IRS.EQ.2) GO TO 60             STR00090
      IF(EPSIL.GT.210..AND.EPSIL.LE.330..AND.IRS.EQ.1) GO TO 60            STR00100
      IF(EPSIL.GT.210..AND.EPSIL.LE.330..AND.IRS.EQ.2) GO TO 50            STR00110
      CST=((CL+CW)/2.)                                                     STR00120
      GO TO 100                                                            STR00130
   50 CST=CL                                                               STR00140
      GO TO 100                                                            STR00150
   60 CST=CW                                                               STR00160
  100 CONTINUE                                                             STR00170
      RETURN                                                               STR00180
      END                                                                  STR00190
```

```
      SUBROUTINE DECIDE(XX,YY,X1,Y1,X2,Y2,IANS)                  DEC00010
      AX=XX-X1                                                   DEC00020
      AY=YY-Y1                                                   DEC00030
      BX=X2-X1                                                   DEC00040
      BY=Y2-Y1                                                   DEC00050
      A=SQRT(AX**2+AY**2)                                        DEC00060
      B=SQRT(BX**2+BY**2)                                        DEC00070
      CS=(AX*BX+AY*BY)/(A*B)                                     DEC00080
      IF(CS.LT.0.) IANS=0                                        DEC00090
      IF(CS.GE.0.) IANS=1                                        DEC00100
      RETURN                                                     DEC00110
      END                                                        DEC00120
```

```
      SUBROUTINE SUP8 (INIFLG,I1,I2,A1,X1,X2,X3,X4,A2,                  SUP00010
     &I5,X5,A3,X6,X7,I6,X8,X9,X10,X11,I7,I8,I9,I10,I11,I12,             SUP00020
     &I13,EMCRUZ,EMIDLE)                                               SUP00030
C                                                                       SUP00040
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IRDFLG,SP3FLG,NMHFLG,IDLFLG,   SUP00050
     *              UNFFLG,MYMRFG,IMFLG,ICEVFG,PRTFLG,IFORM            SUP00060
      COMMON/REGCOM/IREJN                                               SUP00070
      COMMON/LNKCOM/SPD,TEMP,PCCO,PCHS,PCCC,VMTMIX                      SUP00080
      COMMON/ALTCOM/NMYALT,ALTKOD                                       SUP00090
      COMMON/MYMCOM/MYM,MYR,TF                                          SUP00100
      COMMON/JUNK1/AC,XLOAD,TRAILR,ABSHUM                               SUP00110
      COMMON/JUNK2/HGWGT,HDWGT,HGCID,HDCID                              SUP00120
      COMMON/PROJCM/PROJID                                              SUP00130
      COMMON/IMCOM/ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2                    SUP00140
      COMMON/SP1COM/SP1,SPAV                                            SUP00150
C                                                                       SUP00160
      INTEGER ALHFLG,TRKFLG,ALTFLG,ALTKOD(4,20),CY,VMFLAG,SP3FLG,       SUP00170
     *        NMHFLG,IDLFLG,UNFFLG,PRTFLG                               SUP00180
      REAL XLOAD(3),SPD(3),VMTMIX(6),MYM(20,6),MYR(20,6),TF(20,6)       SUP00190
      REAL EFRETM(3,6),WTEDEF(3),LNKDTA(7),PROJID(20)                   SUP00200
      EQUIVALENCE (SPD(1),LNKDTA(1))                                    SUP00210
C     DATA VMTMIX/.803,.058,.056,.045,.031,.005/                        SUP00220
      DATA IREAD,IWRI/5,6/                                              SUP00230
      REAL COMCCC(6),IDLRTM(3,6),IDLWTD(3)                              SUP00240
      DIMENSION A2(6),A3(3)                                             SUP00250
      DATA IRJOLD/0/                                                    SUP00260
      DATA IMOLD/0/                                                     SUP00270
C                                                                       SUP00280
C                                                                       SUP00290
C                                                                       SUP00300
C                                                                       SUP00310
      IREJN=I1                                                          SUP00320
      CY=I2                                                             SUP00330
      TEMP=X1                                                           SUP00340
      PCCO=X2                                                           SUP00350
      PCHS=X3                                                           SUP00360
      PCCC=X4                                                           SUP00370
      DO 5 J=1,6                                                        SUP00380
    5 VMTMIX(J)=A2(J)                                                   SUP00390
                                                                        SUP00400
```

```
      ALHFLG=I5                                                    SUP00410
      AC=X5                                                        SUP00420
      DO 6 J=1,3                                                   SUP00430
    6 XLOAD(J)=A3(J)                                               SUP00440
      TRAILR=X6                                                    SUP00450
      ABSHUM=X7                                                    SUP00460
      TRKFLG=I6                                                    SUP00470
      HGWGT=X8                                                     SUP00480
      HDWGT=X9                                                     SUP00490
      HGCID=X10                                                    SUP00500
      HDCID=X11                                                    SUP00510
      IMFLG=I7                                                     SUP00520
      ICYIM=I8                                                     SUP00530
      ISTRIN=I9                                                    SUP00540
      IMTFLG=I10                                                   SUP00550
      MODYR1=I11                                                   SUP00560
      MODYR2=I12                                                   SUP00570
      SPD(1)=A1                                                    SUP00580
      SPD(2)=A1                                                    SUP00590
      SPD(3)=A1                                                    SUP00600
C                                                                  SUP00610
C                                                                  SUP00620
      IF(INIFLG.EQ.0) GO TO 100                                    SUP00630
      MYMRFG=0                                                     SUP00640
      MSFLG=1                                                      SUP00650
      ALTFLG=0                                                     SUP00660
      SP3FLG=1                                                     SUP00670
      NMHFLG=0                                                     SUP00680
      IDLFLG=1                                                     SUP00690
      UNFFLG=0                                                     SUP00700
      ICEVFG=1                                                     SUP00710
      IFORM=1                                                      SUP00720
      PRTFLG=0                                                     SUP00730
      INFLG=0                                                      SUP00740
      IF(MYMRFG.EQ.1) READ(2,50) MYM,MYR                           SUP00750
   50 FORMAT(20F4.1)                                               SUP00760
      CALL TFCALX                                                  SUP00770
100   CONTINUE                                                     SUP00780
C                                                                  SUP00790
C**CHECK CALENDAR YEAR                                             SUP00800
```

```
      IF(CY.GE.70) GO TO 505                                                    SUP00810
      WRITE(IWRI,785)                                                           SUP00820
  785 FORMAT(' ***ERROR: CALENDAR YEAR RANGE IS 70 THRU 99')                    SUP00830
      STOP                                                                      SUP00840
  505 CONTINUE                                                                  SUP00850
      ICYPR = CY                                                                SUP00860
      IF(CY.GT.95) CY = 95                                                      SUP00870
C                                                                               SUP00880
C**CHECK AMBIENT TEMPERATURE                                                    SUP00890
      IF(TEMP.GE.0.0.AND.TEMP.LE.110.) GO TO 697                                SUP00900
      WRITE(IWRI,787)                                                           SUP00910
  787 FORMAT(' ***ERROR: VALID TEMPERATURE RANGE IS 0-110 DEG.(F)')             SUP00920
      STOP                                                                      SUP00930
  697 CONTINUE                                                                  SUP00940
C                                                                               SUP00950
C**CHECK INPUT SPEED(S)                                                         SUP00960
      IF(SP3FLG.EQ.1) GO TO 650                                                 SUP00970
      IF(SP1.GT.0.) GO TO 620                                                   SUP00980
      WRITE(IWRI,786)                                                           SUP00990
  786 FORMAT(' ***ERROR: SPEED MUST BE POSITIVE')                               SUP01000
      STOP                                                                      SUP01010
  620 IF(SP1.GT.60.) SP1 = 60.                                                  SUP01020
      IF(SP1.LT.5.) WRITE(IWRI,788)                                             SUP01030
  788 FORMAT(' **WARNING: AVG. ROUTE SPEED LESS THAN 5 M.P.H.')                 SUP01040
      GO TO 695                                                                 SUP01050
C                                                                               SUP01060
  650 CONTINUE                                                                  SUP01070
      IF(SPD(1).GT.0.0.AND.SPD(2).GT.0.0.AND.SPD(3).GT.0.) GO TO 670            SUP01080
      WRITE(IWRI,786)                                                           SUP01090
      STOP                                                                      SUP01100
  670 CONTINUE                                                                  SUP01110
      DO 671 I=1,3                                                              SUP01120
      IF(SPD(I).LT.5.) WRITE(IWRI,788)                                          SUP01130
  671 IF(SPD(I).GT.60.) SPD(I) = 60.                                            SUP01140
C                                                                               SUP01150
  695 CONTINUE                                                                  SUP01160
C                                                                               SUP01170
C**END SPEED CHECK                                                              SUP01180
C                                                                               SUP01190
      IF(SP3FLG.EQ.1) GO TO 520                                                 SUP01200
```

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C**HERE TO DECOMPOSE SINGLE ENTERED SPEED INTO BAG SPEEDS                    SUP01210
C       SPD(1) = SP1*1.30                                                    SUP01220
C       SPD(2) = SP1*.825                                                    SUP01230
C       SPD(3) = SP1*1.30                                                    SUP01240
        SPD(1) = SP1                                                         SUP01250
        SPD(2) = SP1                                                         SUP01260
        SPD(3) = SP1                                                         SUP01270
C       SPD(1) = SP1*(1.3777386 - (PCCC*.30/79.42))                          SUP01280
C       SPD(2) = SP1*(.75935 + (PCHS*.175/72.72))                            SUP01290
C       SPD(3) = SPD(1)                                                      SUP01300
C                                                                            SUP01310
C       PCHSNC = PCCC - PCCO + PCHS                                          SUP01320
C       PCHSTB = 100. - PCCC - PCHS                                          SUP01330
C       SPD(1) = SP1*(1.41114406 - .0041114406*PCCO)                         SUP01340
C       SPD(2) = SP1*(.6162276026 + .003837724*PCHSTB)                       SUP01350
C       SPD(3) = SP1*(1.44902449 - .0044902449*PCHSNC)                       SUP01360
520     CONTINUE                                                             SUP01370
C                                                                            SUP01380
C                                                                            SUP01390
        IF(IREJN.NE.IRJOLD.OR.IMOLD.NE.IMFLG) CALL INITEX(NMYALT,ALTKOD)     SUP01400
        IF(IMFLG.EQ.1.AND.(IMOLD.NE.IMFLG.OR.IREJN.NE.IRJOLD)) CALL LDVIMXSUP01410
        IRJOLD=IREJN                                                         SUP01420
        IMOLD=IMFLG                                                          SUP01430
        CALL EFCALX(CY,LNKDTA,VMTMIX,EFRETM,WTEDEF,COMCCC,IDLRTM,IDLWTD)     SUP01440
        IF(I13.EQ.1) CALL OUTPUT(ICYPR,EFRETM,WTEDEF,COMCCC,IDLRTM,          SUP01450
       &IDLWTD)                                                              SUP01460
        EMCRUZ=WTEDEF(2)                                                     SUP01470
        EMIDLE=IDLWTD(2)                                                     SUP01480
        RETURN                                                               SUP01490
        END                                                                  SUP01500
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      SUBROUTINE OUTPUT(CY,EFRETM,WTEDEF,COMCCC,IDLRTM,IDLWTD)                OUT00010
C                                                                             OUT00020
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IRDFLG,SP3FLG,NMHFLG,IDLFLG,         OUT00030
     *              UNFFLG,MYMRFG,IMFLG,ICEVFG,PRTFLG,IFORM                   OUT00040
      COMMON/REGCOM/IREJN                                                     OUT00050
      COMMON/BEFCOM/BEF                                                       OUT00060
      COMMON/LNKCOM/SPD,TEMP,PCCO,PCHS,PCCC,VMTMIX                            OUT00070
      COMMON/ALTCOM/NMYALT,ALTKOD                                             OUT00080
      COMMON/MYMCOM/MYM,MYR,TF                                                OUT00090
      COMMON/JUNK1/AC,XLOAD,TRAILR,APSHUM                                     OUT00100
      COMMON/JUNK2/HGWGT,HDWGT,HGCID,HDCID                                    OUT00110
      COMMON/RET1/ALHRET                                                      OUT00120
      COMMON/RET2/TRKRET(20,3,2)                                              OUT00130
      COMMON/IMCOM/ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2                          OUT00140
      COMMON/SP1COM/SP1,SPAV                                                  OUT00150
C                                                                             OUT00160
      INTEGER ALHFLG,TRKFLG,ALTFLG,ALTKOD(4,20),CY,VMFLAG,SP3FLG,             OUT00170
     *        NMHFLG,IDLFLG,UNFFLG,MYMRFG,PRTFLG                            OUT00180
      REAL VMTMIX(6),MYM(20,6),MYR(20,6),PNAM1(3),PNAM2(3),PNAM3(3)           OUT00190
      REAL SPD(3)                                                             OUT00200
      REAL EVPNAM(3),EXHHDR(9),IDLNM1(3),IDLNM2(3),IDLNM3(3)                  OUT00210
      REAL IDLRTM(3,6),IDLWTD(3),PNAMH(2)                                     OUT00220
      REAL IDLHDR(8),IDLHD2(4),REGN1(3),REGN2(3)                              OUT00230
      REAL COMPEF(20,3,6)                                                     OUT00240
      REAL ALHRET(20,4,3)                                                     OUT00250
      REAL A(20,3,3),U(20,3,3),L(3,3),H(3),XLOAD(3)                           OUT00260
      REAL EFRETM(3,6),WTEDEF(3),LNKDTA(7),PROJID(20)                         OUT00270
      REAL COMCCC(6),TF(20,6)                                                 OUT00280
      REAL BEF(20,26,3,6)                                                     OUT00290
      REAL YESNO(2)                                                           OUT00300
      EQUIVALENCE (SPD(1),LNKDTA(1))                                          OUT00310
C                                                                             OUT00320
      DATA PROJID/'EMIS','SION',' FAC','TOR ','CALC',                         OUT00330
     &'ULAT','ION ','    ','SUPR','OUTI',                                   OUT00340
     &'NE S','UP8','(MOD','ILE1',' PRO',                                     OUT00350
     &'GRAM',' MOD','IFIE','D)  ','    '/                                    OUT00360
      DATA PNAMH/'NON-','METH'/                                               OUT00370
      DATA PNAM1/'   T','EXHA','EXHA'/                                        OUT00380
      DATA PNAM2/'OTAL','UST ','UST '/                                        OUT00390
      DATA PNAM3/' HC ',' CO ','NOX '/                                        OUT00400
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      DATA IDLNM1/'   I','   I','   I'/                                    OUT00410
      DATA IDLNM2/'DLE ','DLE ','DLE '/                                    OUT00420
      DATA IDLNM3/' HC ',' CO ','NOX '/                                    OUT00430
      DATA EVPNAM/'   *','EVAP',' HC '/                                    OUT00440
      DATA IWRI,IWRUNF/6,9/                                                OUT00450
      DATA EXHHDR/'COMP','OSIT','E EM','ISSI','ON F','ACTO',               OUT00460
     *    'RS (','GM/M','ILE)'/                                            OUT00470
      DATA IDLHDR/'IDLE',' EM1','SSIO','N FA','CTOR','S (G',               OUT00480
     *   'M/MI','N)  '/                                                    OUT00490
      DATA IDLHD2/'    ','  CO','RREC','TED '/                             OUT00500
      DATA REGN1/'49-S','CALI','HI-A'/                                     OUT00510
      DATA REGN2/'TATE','F.  ','LT. '/                                     OUT00520
      DATA DASH/'----'/                                                    OUT00530
      DATA INITFL/1/                                                       OUT00540
      DATA YESNO/'NO  ','YES '/                                            OUT00550
C                                                                          OUT00560
C*************************************************************************OUT00570
      IF(NMHFLG.EQ.0) GO TO 77                                             OUT00580
      PNAM1(1) = PNAMH(1)                                                  OUT00590
      PNAM2(1) = PNAMH(2)                                                  OUT00600
77    CONTINUE                                                             OUT00610
C                                                                          OUT00620
      IF(INITFL.NE.1) GO TO 175                                            OUT00630
C**HERE FIRST TIME                                                         OUT00640
      INITFL=0                                                             OUT00650
      IF(IFORM.EQ.0) WRITE(IWRI,7011) PROJID                               OUT00660
      IF(IFORM.EQ.1) WRITE(IWRI,701) PROJID                                OUT00670
      IF(IFORM.EQ.1)                                                       OUT00680
     *WRITE(IWRI,7017) PNAM1(1),PNAM2(1),PNAM3(1)                          OUT00690
7017  FORMAT('0',2X,'*',2A4,A3,' EMISSION FACTORS INCLUDE ',               OUT00700
     *  'EVAP. HC EMISSION FACTORS')                                       OUT00710
C                                                                          OUT00720
      IF(IFORM.EQ.1) WRITE(IWRI,710)                                       OUT00730
175   CONTINUE                                                             OUT00740
C                                                                          OUT00750
      IF(IFORM.EQ.0) GO TO 888                                             OUT00760
C*************************************************************************OUT00770
C                                                                          OUT00780
      WRITE(IWRI,7029)                                                     OUT00790
      IF(SP3FLG.EQ.1)                                                      OUT00800
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      *WRITE(IWRI,703) CY,TEMP,VMTMIX,REGN1(IREJN),REGN2(IREJN),SPD,SPAV,OUT00810
      *   PCCO,PCHS,PCCC                                                  OUT00820
       IF(SP3FLG.EQ.0)                                                    OUT00830
      *WRITE(IWRI,7035) CY,TEMP,VMTMIX,REGN1(IREJN),REGN2(IREJN),SP1,SPD,OUT00840
      *   SPAV,PCCO,PCHS,PCCC                                             OUT00850
       IF(ALHFLG.EQ.1) WRITE(IWRI,704) AC,XLOAD,TRAILR,ABSHUM             OUT00860
       IF(TRKFLG.EQ.1) WRITE(IWRI,705) HGWGT,HDWGT,HGCID,HDCID            OUT00870
       IF(IMFLG.EQ.1) WRITE(IWRI,7051) ICYIM,ISTRIN,YESNO(IMTFLG+1)       OUT00880
C      IF(IMFLG.EQ.1) WRITE(IWRI,7052) MODYR1,MODYR2                      OUT00890
       WRITE(IWRI,7059) EXHHDR                                            OUT00900
       WRITE(IWRI,706)                                                    OUT00910
C                                                                         OUT00920
       IF(PRTFLG.EQ.0.OR.PRTFLG.EQ.1)                                     OUT00930
      *WRITE(IWRI,707) PNAM1(1),PNAM2(1),PNAM3(1),(EFRETM(1,IM),IM=1,6),  OUT00940
      *   WTEDEF(1)                                                       OUT00950
       IF(ICEVFG.EQ.1) WRITE(IWRI,708) EVPNAM,COMCCC,DASH                 OUT00960
       IF(PRTFLG.EQ.0.OR.PRTFLG.EQ.2)                                     OUT00970
      *WRITE(IWRI,707) PNAM1(2),PNAM2(2),PNAM3(2),(EFRETM(2,IM),IM=1,6),  OUT00980
      *   WTEDEF(2)                                                       OUT00990
       IF(PRTFLG.EQ.0.OR.PRTFLG.EQ.3)                                     OUT01000
      *WRITE(IWRI,707) PNAM1(3),PNAM2(3),PNAM3(3),(EFRETM(3,IM),IM=1,6),  OUT01010
      *   WTEDEF(3)                                                       OUT01020
C                                                                         OUT01030
       IF(IDLFLG.EQ.0) GO TO 200                                          OUT01040
       WRITE(IWRI,709) IDLHD2,IDLHDR                                      OUT01050
       WRITE(IWRI,707) (IDLNM1(IQ),IDLNM2(IQ),IDLNM3(IQ),(IDLRTM(IQ,IM),  OUT01060
      *   IM=1,6),IDLWTD(IQ),IQ=1,3)                                      OUT01070
200    CONTINUE                                                           OUT01080
C                                                                         OUT01090
       WRITE(IWRI,710)                                                    OUT01100
C                                                                         OUT01110
       GO TO 899                                                          OUT01120
C                                                                         OUT01130
C*************************************************************************OUT01140
C                                                                         OUT01150
888    CONTINUE                                                           OUT01160
          IPP1=PRTFLG                                                     OUT01170
          IPP2=PRTFLG                                                     OUT01180
          IF(PRTFLG.EQ.0) IPP1=1                                          OUT01190
                                                                          OUT01200
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         IF(PRTFLG.EQ.0) IPP2=2                                              OUT01210
       DO 1203 IPNX=IPP1,IPP2                                                OUT01220
       WRITE(IWRI,79080) IREJN,CY,SPD,TEMP,PCCO,PCHS,PCCC,IPNX,              OUT01230
      *  (EFRETM(IPNX,IM),IM=1,6),VMTMIX,WTEDEF(IPNX)                       OUT01240
1203   CONTINUE                                                              OUT01250
79080  FORMAT(1X,I1,1X,I2.1X,F4.1,'/',F4.1,'/',F4.1,1X,                      OUT01260
      *  F3.0,1X,F5.1,1X,F5.1,1X,F5.1,1X,I1,6F6.1,6F6.3,F7.2)                OUT01270
C                                                                           OUT01280
899    CONTINUE                                                             OUT01290
C                                                                           OUT01300
C                                                                           OUT01310
C*************************************************************************OUT01320
C                                                                           OUT01330
       IF(UNFFLG.EQ.1) WRITE(IWRUNF) EFRETM,WTEDEF                          OUT01340
C                                                                           OUT01350
C*************************************************************************OUT01360
701    FORMAT('1',20A4/)                                                    OUT01370
7011   FORMAT('1',20A4)                                                     OUT01380
C                                                                           OUT01390
7029   FORMAT(32X,'VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC')          OUT01400
C                                                                           OUT01410
703    FORMAT('  CAL. YEAR: 19',I2,5X,'TEMP: ',F4.1,                       OUT01420
      *  '(F)',8X,5(F5.3,'/'),F5.3,                                         OUT01430
      *  /1X,' REGION: ',2A4,4X,F4.1,'/',F4.1,'/',F4.1,                     OUT01440
      *  ' MPH ','(',F4.1,')',7X,' ',F5.1,'/',F5.1,'/',F5.1 )               OUT01450
C                                                                           OUT01460
7035   FORMAT('  CAL. YEAR: 19',I2,5X,'TEMP: ',F4.1,                        OUT01470
      *  '(F)',8X,5(F5.3,'/'),F5.3,                                         OUT01480
      *  /1X,' REGION: ',2A4,4X,F4.1,':',F4.1,'/',F4.1,'/',F4.1,            OUT01490
      *  ' MPH ','(',F4.1,')',3X,' ',F5.1,'/',F5.1,'/',F5.1 )               OUT01500
704    FORMAT('   AC:',F6.2,2X,'XLOAD:',3F7.2,2X,'TRAILR:',                  OUT01510
      *  F7.2,2X,'ABSHUM:',F7.2)                                            OUT01520
C                                                                           OUT01530
705    FORMAT('   HGWGT:',F7.0,2X,'HDWGT:',F7.0,2X,'HGCID:',                 OUT01540
      *  F7.2,2X,'HDCID:',F7.2)                                             OUT01550
C                                                                           OUT01560
7051   FORMAT('   LDV I/M PROGRAM STARTING IN 19',I2,                        OUT01570
      *  ', STRINGENCY LEVEL ',I2,'%, MECH. TRAINING: ',A4)                 OUT01580
C                                                                           OUT01590
7052   FORMAT('   I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 19',          OUT01600
```

```
     *  I2,' THROUGH 19',I2)                                                  OUT01610
7055  FORMAT('0',22X,9A4)                                                     OUT01620
C                                                                             OUT01630
706   FORMAT(' ',15X,'LDV       LDT1      LDT2      HDG       HDD    ',      OUT01640
     *  '     MC      ALL MODES')                                            OUT01650
C                                                                             OUT01660
707   FORMAT((1X,2A4,A3,':',6(F7.2,2X),1X,F8.2))                              OUT01670
C                                                                             OUT01680
708   FORMAT(1X,2A4,A3,':',6(F7.2,2X),5X,A4)                                  OUT01690
C                                                                             OUT01700
709   FORMAT('0',16X,4A4,8A4)                                                 OUT01710
C                                                                             OUT01720
710   FORMAT(' ----------------------------------------',                     OUT01730
     *'----------------------------------------')                            OUT01740
C                                                                             OUT01750
C                                                                             OUT01760
C     DEBUG SUBCHK                                                            OUT01770
      RETURN                                                                  OUT01780
      END                                                                     OUT01790
```

```
      SUBROUTINE EFCALX(CY,LNKDTA,MS,CFRETM,WTEDEF,CCRETM,IDLRTM,IDLWTD)EFC00010
C                                                                       EFC00020
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IRDFLG,SP3FLG,NMHFLG,IDLFLG,   EFC00030
     *              UNFFLG,MYMRFG,IMFLG,ICEVFG,PRTFLG,IFORM            EFC00040
      COMMON/CEVCOM/CCEV                                                EFC00050
      COMMON/REGCOM/IREJN                                               EFC00060
      COMMON/BEFCOM/BEF                                                 EFC00070
      COMMON/IDLCOM/IDLBEF                                              EFC00080
      COMMON/MYMCOM/MYM,MYP,TF                                          EFC00090
C                                                                       EFC00100
      INTEGER MYP , P ,  CYP                                            EFC00110
      INTEGER ALHFLG,TRKFLG,ALTFLG,ALTKOD(4,20),CY,MSFLG,SP3FLG,        EFC00120
     *        NMHFLG,IDLFLG,UNFFLG,MYMRFG,PRTFLG                        EFC00130
C                                                                       EFC00140
      REAL IDLBEF(20,26,3,6),IDLFAC(20,3,6),IDLCMP(3,6),IDLWTD(3)       EFC00150
      REAL IDLRTM(3,6)                                                  EFC00160
      REAL COMPCC(20,6),CCRETM(6)                                       EFC00170
      REAL CFRET(20,3,6)                                                EFC00180
      REAL      BEF(20,26,3,6),      CCEV(45,6),                        EFC00190
     *          CEFLDV(3),           CEFLT1(3),                         EFC00200
     *          CEFLT2(3),           CEFHDG(3),                         EFC00210
     *          CEFHDD(3),           CEFMCC(3),                         EFC00220
     *          EFRETM(3,6),         COMPEF(20,3,6),                    EFC00230
     *          COMPMY(3,6),         LNKDTA(7),                         EFC00240
     *          MYM(20,6),           MYR(20,6),                         EFC00250
     *          MS(6),               PCCO,                              EFC00260
     *          PCCC,                PCHS,                              EFC00270
     *          SPD(3),              TEMP,                              EFC00280
     *          TF(20,6),            TFNORM(6),                         EFC00290
     *          WTEDEF(3)                                               EFC00300
      DIMENSION R1(20,3,6),R2(20,3,6),XISPD(3)                          EFC00310
C                                                                       EFC00320
C                                                                       EFC00330
C***********************************************************************EFC00340
C                                                                       EFC00350
      SPD(1)  = LNKDTA(1)                                               EFC00360
      SPD(2)  = LNKDTA(2)                                               EFC00370
      SPD(3)  = LNKDTA(3)                                               EFC00380
      TEMP    = LNKDTA(4)                                               EFC00390
      PCCO    = LNKDTA(5)                                               EFC00400
```

```
      PCHS     = LNKDTA(6)
      PCCC     = LNKDTA(7)
C
C
            CALL BIGCFX(CY,TEMP,PCCO,PCHS,PCCC,SPD,CFRET)
C
      XISPD(1)=5.0
      XISPD(2)=5.0
      XISPD(3)=5.0
      XITEMP=75.0
      XIPCCO=0.0
      XIPCHS=0.0
      XIPCCC=0.0
      CALL BIGCFX(CY,TEMP,PCCO,PCHS,PCCC,XISPD,R1)
      CALL BIGCFX(CY,XITEMP,XIPCCO,XIPCHS,XIPCCC,XISPD,R2)
C
      CYP = CY - 69
C
C
      DO 500 P = 1,3
              WTFDEF(P) = 0.0
              IDLWTD(P) = 0.0
         DO 400 M = 1,6
              COMPMY(P,M) = 0.0
              IDLCMP(P,M) = 0.0
      IF(P.EQ.1) CCPETM(M)=0.
            DO 300 I = 1,20
C
      MYP = CY -(20-I) - 50
C
              IF (P.EQ.1)  GO TO 333
              GO TO 444
C
333   COMPEF(I,P,M)=(BEF(I,CYP,P,M)*CFRET(I,P,M)+ CCEV(MYP,M))*TF(I,M)
      COMPCC(I,M)  =CCEV(MYP,M)*TF(I,M)
      GO TO 555
444   COMPEF(I,P,M)=(BEF(I,CYP,P,M)*CFRET(I,P,M)                )*TF(I,M)
C
555   CONTINUE
C
```

```
90    CONTINUE                                                          ALU00410
C                                                                       ALU00420
      IF(IMODE.EQ.2) GO TO 15                                           ALU00430
C***  U:  TRAILER TOWING CORRECTION FACTOR                              ALU00440
      DO 91 I=1,20                                                      ALU00450
      IMY=CY-(20-I)-5G                                                  ALU00460
      IF(IMY.GT.24) GO TO 77                                            ALU00470
      CFA=TCFA(IP)                                                      ALU00480
      GO TO 78                                                          ALU00490
77    CONTINUE                                                          ALU00500
      CFA=(PCCOLD*TCFA(IP) + (1.-PCCOLD)*TCFB(IP))/                     ALU00510
     *          (PCCOLD + (1.-PCCOLD)*TCFC(IP))                        ALU00520
78    CONTINUE                                                          ALU00530
C                                                                       ALU00540
      U(I,IMODE,IP) = TRAILR*(CFA-1.) + 1.0                             ALU00550
C                                                                       ALU00560
91    CONTINUE                                                          ALU00570
C                                                                       ALU00580
C                                                                       ALU00590
15    CONTINUE                                                          ALU00600
C***  L:  ADDITIONAL LOADING CORRECTION FACTOR                          ALU00610
      L(IMODE,IP) = XLOAD(IMODE)*(CFLD(IP)-1.) + 1.                     ALU00620
C                                                                       ALU00630
400   CONTINUE                                                          ALU00640
500   CONTINUE                                                          ALU00650
C***  H:  HUMIDITY CORRECTION FACTOR                                    ALU00660
      DO 675 IMODE=1,3                                                  ALU00670
      H(IMODE) = 1. - .0047*(ABSHUM - 75.)                              ALU00680
675   CONTINUE                                                          ALU00690
C                                                                       ALU00700
C                                                                       ALU00710
      DO 800 IP=1,3                                                     ALU00720
      DO 800 IMODE=1,3                                                  ALU00730
      DO 800 IY=1,20                                                    ALU00740
      ALHTMP = A(IY,IMODE,IP)*U(IY,IMODE,IP)*L(IMODE,IP)                ALU00750
      IF(IP.EQ.3) ALHTMP = ALHTMP*H(IMODE)                              ALU00760
      ALHRET(IY,IMODE,IP) = ALHTMP                                      ALU00770
800   CONTINUE                                                          ALU00780
C                                                                       ALU00790
      RETURN                                                            ALU00800
```

```
      SUBROUTINE BIGCFX(CY,T,PCCO,PCHS,PCCC,SPD,CFRET)                  BIG00010
C                                                                       BIG00020
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IRDFLG,SP3FLG,NMHFLG,IDLFLG,   BIG00030
     *              UNFFLG,MYMRFG,IMFLG,ICEVFG,PRTFLG,IFORM            BIG00040
      COMMON/ALTCOM/NMYALT,ALTKOD                                       BIG00050
      COMMON/REGCOM/IREJN                                               BIG00060
      COMMON/JUNK1/AC,XLOAD,TRAILR,ABSHUM                               BIG00070
      COMMON/JUNK2/HGWGT,HDWGT,HGCID,HDCID                              BIG00080
      COMMON/RET1/ALHRET(20,4,3)                                        BIG00090
      COMMON/RET2/TRKRET(20,3,2)                                        BIG00100
      COMMON/SP1COM/SP1,SPAV                                            BIG00110
      COMMON/MYMCOM/MYM,MYR,TF                                          BIG00120
C                                                                       BIG00130
      INTEGER ALHFLG,TRKFLG,ALTFLG,ALTKOD(4,20),CY,MSFLG,SP3FLG,        BIG00140
     *        NMHFLG,IDLFLG,UNFFLG,MYMRFG,PRTFLG                        BIG00150
      INTEGER INITFL,IEQNAR(45,3,3,4),HDINDX(45,3)                      BIG00160
      INTEGER G(45,3,4)                                                 BIG00170
C IN G, 1ST INDEX IS MY, 2ND IS REGION, AND 3RD IS MODE                 BIG00180
C IN IEQNAR, 2ND INDEX IS POLLUTANT, 3RD IS REGION, 4TH IS MODE         BIG00190
C IN HDINDX, 2ND INDEX IS REGION (NOT FUNCTION OF POL, OR MODE)         BIG00200
C                                                                       BIG00210
      REAL COMCCC(6),A(20,3,3),U(20,3,3),                               BIG00220
     *  L(3,3),H(3)                                                     BIG00230
      REAL XLOAD(3)                                                     BIG00240
      REAL COMPEF(20,3,6)                                               BIG00250
      REAL W,T,SPD(3),SPB(3),CFRET(20,3,6)                              BIG00260
      REAL D1(4,3),D2(4,3)                                              BIG00270
      REAL MIDDLE,LEFT                                                  BIG00280
      REAL SPBACK(18,3,3),SPBOT(18,3,3)                                 BIG00290
      REAL ATR(4,3,2),BTR(4,3,2),CTR(4,3,2)                             BIG00300
      REAL C(4,8,3)                                                     BIG00310
      REAL CUMMIL(20,6),MYM(20,6),MYR(20,6),TF(20,6)                    BIG00320
      INTEGER MAXAGE(4)                                                 BIG00330
C                                                                       BIG00340
      DATA MAXAGE/19,19,19,19/                                          BIG00350
      DATA INITFL/1/                                                    BIG00360
C                                                                       BIG00370
C*****************************************************************    BIG00380
C**COEFFICIENTS IN SPEED/TEMP/COLD START FACTOR: EQN,INDEX,POL.         BIG00390
                                                                        BIG00400
```

```
      DATA C/
     *   2.931000, 2.931000, 2.433900, 1.993400,
     *  -0.014779,-0.014779,-0.023591,-0.022269,
     *   0.673,-2.410, 0.623,-0.032, 0.569, 0.863, 0.301, 0.445,
     *   4.750, 2.430, 1.110, 0.497, 0.393, 0.555, 0.284, 0.357,
     *   5.690, 2.610, 1.050, 0.243, 0.471, 0.597, 0.270, 0.175,
     *   5.654800, 5.654800, 5.546000, 4.239100,
     *  -0.015965,-0.015965,-0.028945,-0.017522,
     *  -14.74,-33.89, 11.29, -0.20,  9.62,  9.77,
     *    4.24,  6.99, 42.84, 25.26, 15.85,  4.12,
     *    5.76,  4.71,  2.34,  2.20, 57.57, 35.90,
     *   21.17,  3.96,  7.74,  6.70,  3.13,  2.12,
     *  -0.10E+03,-0.10E+03,-0.10E+03,-0.10E+03,
     *   0.0  , 0.0  , 0.0  , 0.0  , 1.140, 1.160,
     *   3.260, 3.050, 0.0  , 0.0  , 0.335, 0.319,
     *   1.250, 1.260, 2.990, 2.880, 0.0  , 0.0  ,
     *   0.184, 0.180, 0.810, 0.800, 1.890, 2.010,
     *   0.0  , 0.0  , 0.116, 0.126 /
C
C**COEFFICIENTS IN DENOMINATOR OF SPEED/TEMP/COLD START FACTOR
      DATA D1/5.67,2.8,1.38,.54,56.43,36.4,23.7,6.98,1.,1.,2.47,2.46/
      DATA D2/.47,.64,.29,.28,7.59,6.79,3.14,3.14,0.,0.,.18,.18/
C
C**SPEED CORRECTION FACTOR INDEX: CAL. YR., REGION, MODE
      DATA G/15*2, 2, 2, 4, 5, 6, 7,14,17,17,18,18,18,18*18,
     *       15*2, 3, 3, 4, 5, 6, 7,13,16,16,18,18,18,18*18,
     *       15*1, 1, 1, 8, 9,10,11,12,15,15,18,18,18,18*18,
     *
     *       15*2, 2, 2, 4, 5, 6, 7,14,17,17,18,18,18,18*18,
     *       15*2, 2, 2, 4, 5, 6, 7,13,16,16,18,18,18,18*18,
     *       15*1, 1, 1, 8, 9,10,11,12,15,15,18,18,18,18*18,
     *
     *       28*14,17*18,
     *       27*13,18*18,
     *       28*12,17*18,
     *
     *       15*2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,18*17,
     *       15*2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,18*16,
     *       15*1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,18*15 /
C
```

BIG00410
BIG00420
BIG00430
BIG00440
BIG00450
BIG00460
BIG00470
BIG00480
BIG00490
BIG00500
BIG00510
BIG00520
BIG00530
BIG00540
BIG00550
BIG00560
BIG00570
BIG00580
BIG00590
BIG00600
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BIG00650
BIG00660
BIG00670
BIG00680
BIG00690
BIG00700
BIG00710
BIG00720
BIG00730
BIG00740
BIG00750
BIG00760
BIG00770
BIG00780
BIG00790
BIG00800

```
      DATA IEQNAR/17*1,7*2,5*3,16*4,  17*1,7*2,5*3,16*4,
     *            17*1,7*2,2*3,19*4,  15*1,9*2,    21*4,
     *            15*1,9*2,    21*4,  15*1,9*2,    21*4,
     *            17*1,7*2,5*3,16*4,  17*1,7*2,5*3,16*4,
     *            17*1,7*2,2*3,19*4,
     *            17*1,7*2,21*3,      17*1,7*2,21*3,
     *            17*1,7*2,21*3,      17*1,7*2,    21*4,
     *            17*1,7*2,    21*4,  17*1,7*2,    21*4,
     *            17*1,7*2,21*3,      17*1,7*2,21*3,
     *            17*1,7*2,21*3,
     *            28*2,17*3,          28*2,17*3,
     *            28*2,17*3,          27*2,18*4,
     *            27*2,18*4,          27*2,18*4,
     *            28*2,17*3,          28*2,17*3,
     *            28*2,17*3,
     *            27*1,18*2,27*1,18*2,27*1,18*2,
     *            27*1,18*2,27*1,18*2,27*1,18*2,
C                 27*1,18*2,27*1,18*2,27*1,18*2  /
      DATA HDINDX/19*1,4*2,5*3,17*4,
     *            19*1,4*2,1*3,21*4,
C                 19*1,4*2,5*3,17*4   /
C
C*****************************************************************************
C
      IF(INITFL.NE.1) GO TO 177
C  HERE 1ST TIME
      INITFL = 0
      SPB(1) = 26.0
      SFB(2) = 16.0
      SPB(3) = 26.0
      CALL SPFCLX(SPB,SPROT)
C
C
      CALL GETCUM(CUMMIL)
C
C
C*****************************************************************************
C
```

```
177   CONTINUE                                                                BIG01210
C                                                                             BIG01220
      CALL SPFCLX(SPD,SPPACK)                                                 BIG01230
C                                                                             BIG01240
C                                                                             BIG01250
      IF(ALHFLG.EQ.1) CALL ALUH(CY,AC,XLOAD,TRAILR,PCCO,PCCC,ABSUM)           BIG01260
C                                                                             BIG01270
C*************************************************************************** BIG01280
C                                                                             BIG01290
      FCO = PCCO*.01                                                          BIG01300
      FHC = PCHS*.01                                                          BIG01310
      FCC = PCCC*.01                                                          BIG01320
C                                                                             BIG01330
C**FRACTION COLD OP(NON-CAT): FCO                                             BIG01340
C**FRACTION HOT START(CAT):  FHC                                              BIG01350
C**FRACTION COLD OP(CAT)  :   FCC                                             BIG01360
C**FRACTION HOT START(NON-CAT): FHO                                           BIG01370
      FHO = (FCC-FCO) * FHC                                                   BIG01380
C                                                                             BIG01390
      DO 500 I = 1,20                                                         BIG01400
C                                                                             BIG01410
         MY = CY - (20-I)                                                     BIG01420
         MYC = MY - 50                                                        BIG01430
         IAGE = CY - MY                                                       BIG01440
         AGE = IAGE                                                           BIG01450
C                                                                             BIG01460
C************************                                                     BIG01470
      IF(MYC.LE.0) STOP                                                       BIG01480
C>>>>>>>>>>>>>>>>>>>>>>>>>                                                    BIG01490
C                                                                             BIG01500
      DO 500 IMODE = 1,4                                                      BIG01510
C                                                                             BIG01520
      IMOD4 = IMODE                                                           BIG01530
      IF(IMODE.EQ.4) IMOD4 = 6                                                BIG01540
      IAGEM = IAGE                                                            BIG01550
         MAX = MAXAGE(IMODE)                                                  BIG01560
      IF(IAGEM.GT.MAX) IAGEM = MAX                                            BIG01570
      IF(IAGEM.EQ.0) VMTAGE=0.0                                               BIG01580
      IF(IAGEM.GT.0) VMTAGE=CUMMIL(IAGEM,IMOD4)*.0001                         BIG01590
C                                                                             BIG01600
```

```
C           IGX = G(MYC,IREJN,IMODE)                                    BIG01610
C                                                                       BIG01620
            DO 500 IP = 1,3                                             BIG01630
C                                                                       BIG01640
C**DEFAULT                                                              BIG01650
C                                                                       BIG01660
            IEQN = IEQNAR(MYC,IP,IREJN,IMODE)                           BIG01670
C                                                                       BIG01680
C*****************************************                              BIG01690
C                                                                       BIG01700
            IF(ALTFLG.EQ.0) GO TO 777                                   BIG01710
C                                                                       BIG01720
            DO 450 ICH = 1,NMYALT                                       BIG01730
            IF(ALTKOD(1,ICH).EQ.MY) GO TO 877                           BIG01740
450         CONTINUE                                                    BIG01750
            GO TO 550                                                   BIG01760
877         CONTINUE                                                    BIG01770
C**HERE FOR ALTERATION                                                  BIG01780
            IALT = ALTKOD(IP+1,ICH)                                     BIG01790
C                                                                       BIG01800
            IF(IALT.EQ.0) GO TO 777                                     BIG01810
            IF(IALT.EQ.1) IEQN = 3                                      BIG01820
            IF(IALT.GT.1) IEQN = 4                                      BIG01830
777         CONTINUE                                                    BIG01840
C                                                                       BIG01850
C*****************************************                              BIG01860
C                                                                       BIG01870
550         CONTINUE                                                    BIG01880
C                                                                       BIG01890
            FACL = FCO                                                  BIG01900
            FACM = FMO                                                  BIG01910
            IF(IEQN.LT.2) GO TO 888                                     BIG01920
            FACL = FCC                                                  BIG01930
            FACM = FMC                                                  BIG01940
888         FACR = (1.0 - FACL - FACM)                                  BIG01950
C                                                                       BIG01960
C*****************************************************************************BIG01970
C                                                                       BIG01980
            DENOM = D1(IEQN,IP) + D2(IEQN,IP)*VMTAGE                    BIG01990
C                                                                       BIG02000
```

```
      LEFT = FACL * (EXP(C(IEQN,1,IP)+T*C(IEQN,2,IP)) + C(IEQN,3,IP) +  BIG02010
     *  C(IEQN,4,IP)*VMTAGE) * SPBACK(2,1,IP)/SPBOT(2,1,IP)             BIG02020
C                                                                       BIG02030
C                                                                       BIG02040
      MIDDLE=FACM*(C(IEQN,5,IP)+C(IEQN,6,IP)*VMTAGE)                    BIG02050
     *     *SPBACK(IGX,3,IP)/SPBOT(IGX,3,IP)                          BIG02060
C                                                                       BIG02070
C                                                                       BIG02080
      RIGHT=FACR*(C(IEQN,7,IP)+C(IEQN,8,IP)*VMTAGE)                     BIG02090
     *      *SPBACK(IGX,2,IP)/SPBOT(IGX,2,IP)                          BIG02100
C                                                                       BIG02110
      TOP = LEFT + MIDDLE + RIGHT                                       BIG02120
C                                                                       BIG02130
C                                                                       BIG02140
      FACTOR = TOP/DENOM                                                BIG02150
C                                                                       BIG02160
      IF(ALHFLG.EQ.1) FACTOR = FACTOR*ALHRET(I,IMODE,IP)                BIG02170
C                                                                       BIG02180
      IMOD2 = IMODE                                                     BIG02190
C                                                                       BIG02200
      IF(IMODE.EQ.4) IMOD2 = 6                                          BIG02210
C                                                                       BIG02220
      CFRET(I,IP,IMOD2) = FACTOR                                        BIG02230
C                                                                       BIG02240
500   CONTINUE                                                          BIG02250
C                                                                       BIG02260
C*********************************************************************  BIG02270
C                                                                       BIG02280
C                                                                       BIG02290
C   FOR MODES 4 AND 5                                                   BIG02300
C                                                                       BIG02310
C                                                                       BIG02320
      DATA ATR/ 2.42, 1.14, 1.56, 1.54,                                 BIG02330
     *          1.74, 1.54, 1.24, 0.62,                                 BIG02340
     *          .851, .812, .820, .764,                                 BIG02350
     *          0.94, 0.94,  .920, 1.20,                                BIG02360
     *          1.44, 1.44,  1.20, 1.44,                                BIG02370
     *          0.62, 0.62,  0.72, 1.00  /                              BIG02380
C                                                                       BIG02390
      DATA BTR/ -.153, -.065,  -.096, -.071,                            BIG02400
```

```
     *          -.117, -.097,  -.078, -.039,                          BIG02410
     *          .0074, .0094,  .0081, .0120,                          BIG02420
     *          -.055, -.055,  -.051, -.072,                          BIG02430
     *          -.092, -.092,  -.072, -.088,                          BIG02440
     *          -.043, -.043,  -.054, -.074  /                        BIG02450
C                                                                      BIG02460
      DATA CTR/ .0016, .0004, .0009, -.0003,                           BIG02470
     *          .0015, .0010, .0008, .0004,                           BIG02480
     *          .0000, .0000, .0000, .0000,                           BIG02490
     *          .0004, .0004,  .0005, .0006,                          BIG02500
     *          .0010, .0010,  .0006, .0008,                          BIG02510
     *          .0006, .0006,  .0009, .0012  /                        BIG02520
C                                                                      BIG02530
      IF(TRKFLG.EQ.1) CALL TRKOPC(CY,HGWGT,HDWGT,HGCID,HDCID)          BIG02540
C                                                                      BIG02550
C     IF(SP3FLG.EQ.0) SPAV = SPD(1)/(1.3777386 - (PCCC*.30/79.42))     BIG02560
      IF(SP3FLG.EQ.0) SPAV = SP1                                       BIG02570
C     IF(SP3FLG.EQ.1) SPAV = SPD(1)/(1.41114406 - (PCCO*.0041114406))  BIG02580
      IF(SP3FLG.EQ.1) SPAV = SPD(2)                                    BIG02590
C     IF(SP3FLG.EQ.1) SPAV = AMIN1(SPD(1),SPD(2))                      BIG02600
C***ELIMINATE TWO LINES ABOVE                                          BIG02610
C                                                                      BIG02620
C                                                                      BIG02630
      DO 700 IMODE = 4,5                                               BIG02640
      IM = IMODE-3                                                     BIG02650
         DO 700 IP = 1,3                                               BIG02660
C                                                                      BIG02670
      IMY1 = CY-19                                                     BIG02680
              DO 700 IMY = IMY1,CY                                     BIG02690
      IMYP = IMY - 50                                                  BIG02700
      IF(IMYP.LT.1) IMYP=1                                             BIG02710
C                                                                      BIG02720
              IX = 20-(CY-IMY)                                         BIG02730
C                                                                      BIG02740
          INDX = HDINDX(IMYP,IREJN)                                    BIG02750
C                                                                      BIG02760
      IF(IP.EQ.3.AND.IMODE.EQ.4) GO TO 720                             BIG02770
C                                                                      BIG02780
      CFRET(IX,IP,IMODE) = EXP(ATR(INDX,IP,IM) +                       BIG02790
     *  BTR(INDX,IP,IM)*SPAV + CTR(INDX,IP,IM)*SPAV*SPAV)              BIG02800
```

```
C
      GO TO 688                                                          BIG02810
720   CONTINUE                                                           BIG02820
C                                                                        BIG02830
      CFRET(IX,IP,IMODE) = ATR(INDX,IP,IM) + BTR(INDX,IP,IM)*SPAV        BIG02840
C                                                                        BIG02850
688   CONTINUE                                                           BIG02860
C                                                                        BIG02870
      IF(TRKFLG.EQ.1) CFRET(IX,IP,IMODE) = CFRET(IX,IP,IMODE)*           BIG02880
     *                                     TRKRET(IX,IP,IM)              BIG02890
C                                                                        BIG02900
700   CONTINUE                                                           BIG02910
      RETURN                                                             BIG02920
C                                                                        BIG02930
C     DEBUG SUBCHK                                                       BIG02940
      END                                                                BIG02950
                                                                         BIG02960
```

```
C     SUBROUTINE INITEX( NMYALT , ALTKOD )                                INX00010
      INTEGER ALHFLG,TRKFLG,ALTFLG,ALTKOD(4,20),CY,MSFLG,SP3FLG,          INX00020
     *        NMHFLG,IDLFLG,UNFFLG,MYMRFG                                 INX00030
C     CALL BEFGEN                                                         INX00040
C     CALL CCEVAX                                                         INX00050
C     IF (ALTFLG.EQ.1) CALL EFALTX( NMYALT,ALTKOD )                       INX00060
C                                                                         INX00070
C     RETURN                                                              INX00080
      END                                                                 INX00090
                                                                          INX00100
                                                                          INX00110
                                                                          INX00120
                                                                          INX00130
                                                                          INX00140
                                                                          INX00150
```

```
      SUBROUTINE TFCALX                                                  TFC00010
                                                                         TFC00020
C                                                                        TFC00030
      COMMON/MYMCOM/MYM,MYR,TF                                           TFC00040
      REAL TFNORM(6),MYM(20,6),MYR(20,6),TF(20,6)                        TFC00050
C                                                                        TFC00060
      DO 850 M = 1,6                                                     TFC00070
         TFNORM(M) = 0.0                                                 TFC00080
         DO 810 I = 1,20                                                 TFC00090
810         TFNORM(M) = TFNORM(M) + MYM(I,M)*MYR(I,M)                    TFC00100
         DO 820 I = 1,20                                                 TFC00110
820         TF(21-I,M) = ( MYM(I,M)*MYR(I,M) )/TFNORM(M)                 TFC00120
C                                                                        TFC00130
850   CONTINUE                                                           TFC00140
C                                                                        TFC00150
      RETURN                                                             TFC00160
C                                                                        TFC00170
C     DEBUG SUBCHK                                                       TFC00180
C                                                                        TFC00190
      END
```

```
      SUBROUTINE SPFCLX(SPARA,SPBACK)                                  SPF00010
      COMMON/ACOM/A                                                    SPF00020
      REAL SPARA(3),SPBACK(18,3,3),A(6,18,3)                           SPF00030
C                                                                      SPF00040
      DO 30 IP = 1,3                                                   SPF00050
         DO 20 IG = 1,18                                               SPF00060
            IGG = IG                                                   SPF00070
           DO 10 IS = 1,3                                              SPF00080
              SUM = A(6,IGG,IP)                                        SPF00090
              S = SPARA(IS)                                            SPF00100
            DO 5 I = 1,5                                               SPF00110
             SUM = SUM*S + A(6-I,IGG,IP)                               SPF00120
5           CONTINUE                                                   SPF00130
           SCF=EXP(SUM)                                                SPF00140
           IF(IP.EQ.3) SCF=SUM                                         SPF00150
           SPBACK(IG,IS,IP) = SCF                                      SPF00160
10        CONTINUE                                                     SPF00170
20       CONTINUE                                                      SPF00180
30    CONTINUE                                                         SPF00190
      RETURN                                                           SPF00200
C     DEBUG SUBCHK                                                     SPF00210
      END                                                              SPF00220
```

```
      SUBROUTINE BEFGEN                                                 BEF00010
C                                                                       BEF00020
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IRDFLG,SP3FLG,NMHFLG,IDLFLG,   BEF00030
     *              UNFFLG,MYMRFG,IMFLG,ICEVFG,PRTFLG,IFORM             BEF00040
      COMMON/REGCOM/IREJN                                               BEF00050
      COMMON/BEFCOM/BEF                                                 BEF00060
      COMMON/BASECM/BASE3R                                              BEF00070
      COMMON/DELCOM/DEL3R                                               BEF00080
      COMMON/IDLBCM/IDLB3R                                              BEF00090
      COMMON/IDLDCM/IDEL3R                                              BEF00100
      COMMON/IDLCOM/IDLBEF                                              BEF00110
      COMMON/INDXCM/INDX3R                                              BEF00120
      COMMON/MYMCOM/MYM,MYP,TF                                          BEF00130
C                                                                       BEF00140
      REAL BASE3R(10,3,6,3),DEL3R(10,3,6,3)                             BEF00150
      REAL IDLB3R(10,3,6,3),IDEL3R(10,3,6,3)                            BEF00160
      REAL NONMTH(45,6)                                                 BEF00170
      REAL BEF(20,26,3,6),IDLBEF(20,26,3,6)                             BEF00180
      REAL CUMMIL(20,6),MYM(20,6),MYR(20,6),TF(20,6)                    BEF00190
C                                                                       BEF00200
      INTEGER ALHFLG,TRKFLG,ALTFLG,MSFLG,SP3FLG,                        BEF00210
     *        NMHFLG,IDLFLG,UNFFLG,MYMRFG,PRTFLG                        BEF00220
      INTEGER INDX3R(30,3,6,3)                                          BEF00230
      INTEGER MAXAGE(6)                                                 BEF00240
C                                                                       BEF00250
      DATA MAXAGE/19,19,19,19,19,19/                                    BEF00260
      DATA NONMTH/                                                      BEF00270
     *            24*.95 , 21*.85 ,                                     BEF00280
     *            24*.95 , 21*.85 ,                                     BEF00290
     *            24*.95 ,  4*.95 , 17*.85 ,                            BEF00300
     *            24*.95 ,  8*.95 , 13*.85 ,                            BEF00310
     *            45*.98 ,                                              BEF00320
     *            45*.95                     /                          BEF00330
C                                                                       BEF00340
C***********************************************************************BEF00350
C                                                                       BEF00360
      CALL GETCUM(CUMMIL)                                               BEF00370
C                                                                       BEF00380
C*************************************************                      BEF00390
C                                                                       BEF00400
```

```
C       DO 100 IMODE=1,6
C         MAX = MAXAGE(IMODE)
        DO 100 ICY = 70,95
        DO 100 IP = 1,3
          IMY1=ICY-19
          IMY13=ICY
          ICYP=ICY-69
C
        DO 100 MY = IMY1,IMY13
          IMYP =  MY - 50
C         IAGE=ICY - MY
C       IF(IAGE.GT.MAX) IAGE = MAX
          AGE = IAGE
          IA2=ICY-MY+1
          IA3=21-IA2
C
        IF(MY.LT.66) INDX=1
        IF(MY.GE.66) INDX=INDX3R(MY-65,IP,IMODE,IREJN)
C       VMTAGE = CUMMIL(IAGE+1,IMODE)*.0001
       BEF(IA3,ICYP,IP,IMODE) =
      *              BASE3R(INDX,IP,IMODE,IREJN) +
C                       VMTAGE*DEL3R(INDX,IP,IMODE,IREJN)
       IDLBEF(IA3,ICYP,IP,IMODE) =
      *              IDLB3R(INDX,IP,IMODE,IREJN) +
C                       VMTAGE*IDEL3R(INDX,IP,IMODE,IREJN)
100    CONTINUE
C
C*************************************************
C
C      WRITE(6,444) CUMMIL
444    FORMAT(1X,10F8.0)
```

BEF00410
BEF00420
BEF00430
BEF00440
BEF00450
BEF00460
BEF00470
BEF00480
BEF00490
BEF00500
BEF00510
BEF00520
BEF00530
BEF00540
BEF00550
BEF00560
BEF00570
BEF00580
BEF00590
BEF00600
BEF00610
BEF00620
BEF00630
BEF00640
BEF00650
BEF00660
BEF00670
BEF00680
BEF00690
BEF00700
BEF00710
BEF00720
BEF00730
BEF00740
BEF00750
BEF00760
BEF00770
BEF00780
BEF00790
BEF00800

```
C
C       DEBUG SUBCHK
C
        RETURN                                                  BEF00810
        END                                                     BEF00820
                                                                BEF00830
                                                                BEF00840
                                                                BEF00850
```

```
      SUBROUTINE GETCUM(CUMMIL)                                          GET00010
C                                                                        GET00020
      COMMON/MYMCOM/MYMDUM,MYR,TF                                        GET00030
C                                                                        GET00040
      REAL CUMMIL(20,6),MYM(20,6),MYMDUM(20,6),MYR(20,6),TF(20,6)        GET00050
      REAL FRAC(4,6)                                                     GET00060
      DATA FRAC/                                                         GET00070
     *          .75 , .375 , .25 , .875 ,                               GET00080
     *          .75 , .375 , .25 , .875 ,                               GET00090
     *          .75 , .375 , .25 , .875 ,                               GET00100
     *          .50 , .25  , .50 , .75  ,                               GET00110
     *          .50 , .25  , .50 , .75  ,                               GET00120
     *          .50 , .25  , .50 , .75    /                             GET00130
C                                                                        GET00140
      DO 10 I1=1,6                                                       GET00150
      DO 10 I2=1,20                                                      GET00160
10    MYM(I2,I1) = MYMDUM(I2,I1)*100000.                                 GET00170
C                                                                        GET00180
      DO 100 IM=1,6                                                      GET00190
         CUMMIL(1,IM)=MYM(1,IM)*FRAC(2,IM)                               GET00200
      DO 90 I=2,20                                                       GET00210
         SUM=0.                                                          GET00220
         SUM2=0.                                                         GET00230
         II=I-1                                                          GET00240
      DO 80 J=1,II                                                       GET00250
80    SUM=SUM+MYM(J,IM)                                                  GET00260
         III=II-1                                                        GET00270
         IF(III.EQ.0) GO TO 74                                           GET00280
      DO 70 L=1,III                                                      GET00290
70    SUM2=SUM2+MYM(L,IM)                                                GET00300
C                                                                        GET00310
74    CONTINUE                                                           GET00320
         T1=SUM+MYM(I,IM)*FRAC(2,IM)                                     GET00330
         T2=SUM2+MYM(II,IM)*FRAC(4,IM)                                   GET00340
         T1=T1*FRAC(1,IM)                                                GET00350
         T2=T2*FRAC(3,IM)                                                GET00360
         TSUM=T1+T2                                                      GET00370
90    CUMMIL(I,IM)=TSUM                                                  GET00380
100   CONTINUE                                                           GET00390
C                                                                        GET00400
```

```
C     WRITE(6,444) CUMMIL                                        GET00410
444   FORMAT(1X,10F8.0)                                          GET00420
C                                                                GET00430
      RETURN                                                     GET00440
C                                                                GET00450
C     DEBUG SUBCHK                                               GET00460
      END                                                        GET00470
```

```
      SUBROUTINE EFALTX( NMYALT , ALTKOD )                                  EFA00010
C                                                                           EFA00020
      COMMON/BEFCOM/BEF                                                     EFA00030
C                                                                           EFA00040
      INTEGER ALTKOD(4,20),NMYALT,CYI,P,ISTD1(3),MYI,ICY                    EFA00050
C                                                                           EFA00060
      REAL BEF(20,26,3,6),EFREP(20,4,3)                                     EFA00070
C                                                                           EFA00080
      DATA EFREP/1.0,1.2,1.4,1.6,1.8,2.0,2.2,2.4,2.6,2.8,3.0,3.0,3.0,       EFA00090
     *  0.6,0.7,0.8,1.0,1.1,1.2,1.3,1.4,1.6,1.7, 3*1.8,                     EFA00100
     *  0.27,0.32,0.38,0.43,0.49,0.54,0.59,0.65,0.70,0.76,3*0.81,13*0.,     EFA00110
     *  23.7,26.8,30.0,33.1,36.2,39.4,42.5,45.7,48.8,4*51.9,                EFA00120
     *  6.98,10.12,13.26,16.40,19.54,22.68,25.82,28.96,32.10,4*35.24,       EFA00130
     *  2.2,4.16,6.12,8.08,10.04,12.,13.96,15.92,17.88,4*19.84,             EFA00140
     *  13*0.0,                                                             EFA00150
     *  2.00,2.06,2.12,2.18,2.24,2.30,2.36,2.42,2.48,2.54,3*2.60,           EFA00160
     *  1.50,1.56,1.62,1.68,1.74,1.80,1.86,1.92,1.98,2.04,3*2.10,           EFA00170
     *  1.00,1.04,1.08,1.12,1.16,1.20,1.24,1.28,1.32,1.36,3*1.40,           EFA00180
     *  0.24,0.29,0.34,0.40,0.56,0.73,0.90,1.1,1.3,1.5,3*1.7,84*0. /        EFA00190
C                                                                           EFA00200
      DO 200 I = 1,NMYALT                                                   EFA00210
C                                                                           EFA00220
        MYI1    = ALTKOD(1,I) - 69                                          EFA00230
        ISTD1(1) = ALTKOD(2,I)                                              EFA00240
        ISTD1(2) = ALTKOD(3,I)                                              EFA00250
        ISTD1(3) = ALTKOD(4,I)                                              EFA00260
C                                                                           EFA00270
        DO 110 P = 1,3                                                      EFA00280
          ICODE1 = ISTD1(P)                                                 EFA00290
          IF(ICODE1.EQ.0) GO TO 110                                         EFA00300
        DO 100 K = 1,20                                                     EFA00310
          IREV = 21-K                                                       EFA00320
          IM1 = K-1                                                         EFA00330
          ICY = MYI1 + IM1                                                  EFA00340
          IF(ICY.GT.26) GO TO 100                                           EFA00350
          BEF(IREV,ICY,P,1) = EFREP(K,ICODE1,P)                             EFA00360
100     CONTINUE                                                            EFA00370
C                                                                           EFA00380
110   CONTINUE                                                              EFA00390
C                                                                           EFA00400
```

```
200   CONTINUE                                                    EFA00410
C                                                                 EFA00420
      RETURN                                                      EFA00430
C                                                                 EFA00440
C     DEBUG SUBCHK                                                EFA00450
C                                                                 EFA00460
      END                                                         EFA00470
```

```
      SUBROUTINE CCEVAX                                                      CCE00010
C                                                                            CCE00020
      COMMON/CEVCOM/CCEVRT                                                   CCE00030
C     COMMON/REGCOM/IREJN                                                    CCE00040
C                                                                            CCE00050
      INTEGER CY , MY                                                        CCE00060
C     REAL CCEV(45,6,3),CCEVRT(45,6),LDGSWD(45),CCCAL(45,4,3)                CCE00070
C     DATA LDGSWD/17*.80,.77,.77,3*.74,2*.72,21*.55/                         CCE00080
      DATA CCEV/12*6.63,5*3.33,3*2.53,7*1.76,2*0.60,16*0.15,                 CCE00090
     *          12*6.63,5*3.33,3*2.53,7*1.76,2*0.60,16*0.15,                 CCE00100
     *          17*7.70,11*2.00,1*0.60,16*0.15,                              CCE00110
     *          17*7.70,28*2.00,                                             CCE00120
     *          45*0.,                                                       CCE00130
     *          26*2.17,19*0.,                                               CCE00140
     *                                                                       CCE00150
     *          10*6.63,3*3.33,7*2.53,7*1.76,2*0.60,16*0.15,                 CCE00160
     *          10*6.63,3*3.33,7*2.53,7*1.76,2*0.60,16*0.15,                 CCE00170
     *          17*7.70,11*2.00,1*0.60,16*0.15,                              CCE00180
     *          17*7.70,7*2.00,21*1.19,                                      CCE00190
     *          45*0.,                                                       CCE00200
     *          26*1.60,19*0.,                                               CCE00210
     *                                                                       CCE00220
     *          12*9.00,5*4.52,3*3.44,6*2.39,1*1.76,2*0.60,16*0.15,          CCE00230
     *          12*9.00,5*4.52,3*3.44,6*2.39,1*1.76,2*0.60,16*0.15,          CCE00240
     *          17*10.46,9*2.72,2*2.00,1*0.60,16*0.15,                       CCE00250
     *          17*10.46,28*2.72,                                            CCE00260
     *          45*0.,                                                       CCE00270
C             26*2.17,19*0.                                                  CCE00280
C                          /                                                 CCE00290
      DO 100 IMODE = 1,6                                                     CCE00300
C     DO 90 MY = 1,45                                                        CCE00310
C     CCEVRT(MY,IMODE) = CCEV(MY,IMODE,IREJN)                                CCE00320
90    CONTINUE                                                               CCE00330
100   CONTINUE                                                               CCE00340
C                                                                            CCE00350
C                                                                            CCE00360
                                                                             CCE00370
                                                                             CCE00380
                                                                             CCE00390
                                                                             CCE00400
```

```
      RETURN                                                    CCE00410
C     DEBUG SUBCHK                                              CCE00420
      END                                                       CCE00430
```

```
      SUBROUTINE LDVIMX                                                  LDV00010
C                                                                        LDV00020
      COMMON/BEFCOM/BEF(20,26,2,6)                                       LDV00030
      COMMON/IMCOM/ICYIM,ISTRN,IMTFLG,MODYR1,MODYR2                      LDV00040
C     COMMON/IMCRED/PCIM                                                 LDV00050
      INTEGER CY,CYP,CYIMP,CYIP1,DELY,DEL2,DEL                           LDV00060
      INTEGER PCIM(19,5,4,2,2)                                           LDV00070
C**IN PCIM: DEL,ISTRIN,ITECH,IPROGM,IPOL                                 LDV00080
C                                                                        LDV00090
C*****************************************************************     LDV00100
C                                                                        LDV00110
      IPROGM = 1 + IMTFLG                                                LDV00120
C     ISTRIN = .1*ISTRN                                                  LDV00130
      IF(ISTRN.LT.10.OR.ISTRN.GT.50) STOP                                LDV00140
      IREM = ISTRN - (ISTRN/10)*10                                       LDV00150
C     REM=IREM*.1                                                        LDV00160
      ISTRIN = ISTRN*.1                                                  LDV00170
      STRN = (ISTRN + 0.5)*0.1                                           LDV00180
      ISTRIN = STRN                                                      LDV00190
      CYIMP = ICYIM                                                      LDV00200
C     CYIP1 = ICYIM + 1                                                  LDV00210
                                                                         LDV00220
      DO 100 IPOL=1,2                                                    LDV00230
C     DO 100 CY = CYIP1,95                                               LDV00240
                                                                         LDV00250
          CYP = CY-69                                                    LDV00260
C         DELY = CY - CYIMP                                              LDV00270
                                                                         LDV00280
      DO 90 I = 1,20                                                     LDV00290
         MY = CY - (20-I)                                                LDV00300
         MYP = MY - 50                                                   LDV00310
C        DEL2 = MY - CYIMP                                               LDV00320
                                                                         LDV00330
C     IF(MY.LT.MODYR1.OR.MY.GT.MODYR2) GO TO 90                          LDV00340
      IF(MY.LE.CYIMP) DEL = DELY                                         LDV00350
      IF(MY.GT.CYIMP) DEL = DELY - DEL2                                  LDV00360
C     IF(DEL.GT.19) DEL = 19                                             LDV00370
                                                                         LDV00380
                                                                         LDV00390
                                                                         LDV00400
```

```
C*TEST FOR TECH. I, II, III, OR IV                                      LDV00410
      IF(MY.LT.75) ITECH = 1                                            LDV00420
      IF(MY.GE.75.AND.MY.LE.79) ITECH = 2                               LDV00430
      IF(MY.EQ.80) ITECH = 3                                            LDV00440
      IF(MY.GE.81) ITECH = 4                                            LDV00450
C                                                                       LDV00460
      IF(DEL.EQ.0) PCRED = 0.0                                          LDV00470
      IF(DEL.GT.0.AND.ISTRIN.LT.5)                                      LDV00480
     * PCRED = PCIM(DEL,ISTRIN,ITECH,IPROGM,IPOL)*.01                   LDV00490
     *   + REM*(PCIM(DEL,ISTRIN+1,ITECH,IPROGM,IPOL) -                  LDV00500
C                 PCIM(DEL,ISTRIN,ITECH,IPROGM,IPOL) )*.01              LDV00510
      IF(DEL.GT.0.AND.ISTRIN.EQ.5)                                      LDV00520
     * PCRED = PCIM(DEL,ISTRIN,ITECH,IPROGM,IPOL)*.01                   LDV00530
C                                                                       LDV00540
C*PERHAPS SKIP FOR LDT?                                                 LDV00550
      PCLEFT = 1. - PCRED                                               LDV00560
C                                                                       LDV00570
      BEF(I,CYP,IPOL,1) = BEF(I,CYP,IPOL,1)*PCLEFT                      LDV00580
C                                                                       LDV00590
90    CONTINUE                                                          LDV00600
100   CONTINUE                                                          LDV00610
C                                                                       LDV00620
      RETURN                                                            LDV00630
C                                                                       LDV00640
C     DEBUG SUBCHK                                                      LDV00650
C                                                                       LDV00660
      END                                                               LDV00670
                                                                        LDV00680
```

```
      SUBROUTINE ALUH(CY,AC,XLOAD,TRAILR,PCCO,PCCC,ABSHUM)                    ALU00010
C                                                                             ALU00020
      COMMON/RET1/ALHRET(20,4,3)                                              ALU00030
C                                                                             ALU00040
      INTEGER CY                                                              ALU00050
      REAL COMPEF(20,3,6)                                                     ALU00060
      REAL XLOAD(3)                                                           ALU00070
      REAL PCW(20),CFNIX(20,3,6),COMCCC(6),CFLET(20,3,6),TF(20,6)             ALU00080
      REAL A(20,3,3),U(20,3,3),L(3,3),H(3)                                    ALU00090
      REAL TCFA(3),TCFB(3),TCFC(3)                                            ALU00100
      REAL CFLD(3)                                                            ALU00110
      REAL ACCF(3),PCWAC(45)                                                  ALU00120
C                                                                             ALU00130
      DATA ACCF/1.13,1.18,1.18/                                               ALU00140
      DATA CFLD/1.06,1.20,1.03/                                               ALU00150
      DATA PCWAC/15*.54,3*.66,4*.75,2*.81,21*.81/                             ALU00160
      DATA TCFA/1.32,2.15,1.16/,TCFB/.75,1.55,1.28/,TCFC/.43,.39,.92/         ALU00170
C   IN TCFA ABOVE, 2ND VALUE SHOULD BE 2.15..IT IS 1.15 FOR ORE. CF.          ALU00180
C                                                                             ALU00190
      PCCOLD=PCCC*.01                                                         ALU00200
C                                                                             ALU00210
      DO 207 IP=1,3                                                           ALU00220
      H(IP)=1.                                                                ALU00230
      DO 207 IM=1,3                                                           ALU00240
      L(IP,IM)=1.                                                             ALU00250
      DO 207 IT=1,20                                                          ALU00260
      A(IT,IP,IM)=1.                                                          ALU00270
      U(IT,IP,IM)=1.                                                          ALU00280
      ALHRET(IT,4,IP) = 1.                                                    ALU00290
207   CONTINUE                                                                ALU00300
C                                                                             ALU00310
      DO 500 IP = 1,3                                                         ALU00320
C                                                                             ALU00330
      DO 400 IMODE=1,3                                                        ALU00340
C                                                                             ALU00350
      IF(IMODE.EQ.3) GO TO 15                                                 ALU00360
C*****A:  AIR CONDITIONING CORRECTION FACTOR                                  ALU00370
      DO 90 I=1,20                                                            ALU00380
      IMY = CY - (20-I) - 50                                                  ALU00390
      PCW(I)=PCWAC(IMY)                                                       ALU00400
```

```
      A(I,IMODE,IP) = AC*PCWAC(IMY)*(ACCF(IP)-1.) + 1.0                 ALU00410
90    CONTINUE                                                          ALU00420
C                                                                       ALU00430
      IF(IMODE.EQ.2) GO TO 15                                           ALU00440
C*****U:  TRAILER TWING CORRECTION FACTOR                               ALU00450
      DO 91 I=1,20                                                      ALU00460
      IMY=CY-(20-I)-50                                                  ALU00470
      IF(IMY.GT.24) GO TO 77                                            ALU00480
      CFA=TCFA(IP)                                                      ALU00490
      GO TO 78                                                          ALU00500
77    CONTINUE                                                          ALU00510
      CFA=(PCCOLD*TCFA(IP) + (1.-PCCOLD)*TCFB(IP))/                     ALU00520
     *          (PCCOLD + (1.-PCCOLD)*TCFC(IP))                        ALU00530
78    CONTINUE                                                          ALU00540
C                                                                       ALU00550
      U(I,IMODE,IP) = TRAILR*(CFA-1.) + 1.0                             ALU00560
C                                                                       ALU00570
91    CONTINUE                                                          ALU00580
C                                                                       ALU00590
C                                                                       ALU00600
15    CONTINUE                                                          ALU00610
C*****L:  ADDITIONAL LOADING CORRECTION FACTOR                          ALU00620
      L(IMODE,IP) = XLOAD(IMODE)*(CFLD(IP)-1.) + 1.                     ALU00630
C                                                                       ALU00640
400   CONTINUE                                                          ALU00650
500   CONTINUE                                                          ALU00660
C*****H:  HUMIDITY CORRECTION FACTOR                                    ALU00670
      DO 675 IMODE=1,3                                                  ALU00680
      H(IMODE) = 1. - .0047*(APSHUM - 75.)                              ALU00690
675   CONTINUE                                                          ALU00700
C                                                                       ALU00710
C                                                                       ALU00720
      DO 800 IP=1,3                                                     ALU00730
      DO 800 IMODE=1,3                                                  ALU00740
      DO 800 IY=1,20                                                    ALU00750
      ALHTMP = A(IY,IMODE,IP)*U(IY,IMODE,IP)*L(IMODE,IP)                ALU00760
      IF(IP.EQ.3) ALHTMP = ALHTMP*H(IMODE)                              ALU00770
      ALHRET(IY,IMODE,IP) = ALHTMP                                      ALU00780
800   CONTINUE                                                          ALU00790
C                                                                       ALU00800
```

```
      RETURN                                                            ALU00810
C     DEBUG SUBCHK                                                      ALU00820
      END                                                               ALU00830
```

```
      SUBROUTINE TRKOPC(CY,HGWGT,HDWGT,HGCID,HDCID)                      TRK00010
C                                                                        TRK00020
      COMMON/RET2/TRKRET(20,3,2)                                         TRK00030
      INTEGER CY,INDXAR(45)                                              TRK00040
C**IN B0,B1,AND B2, 1ST INDEX IS YEAR GROUP, 2ND IS VEHTYPE,3RD IS POL   TRK00050
      REAL B0(3,2,3),B1(3,2,3),B2(3,2,3)                                 TRK00060
C                                                                        TRK00070
      DATA B0/1.302,-.584,.762,2.056,2.056,.893,                         TRK00080
     *        .814,.354,.320,-.533,-.533,-.299,                          TRK00090
C             .869,.883,.943,.085,.085,.138     /                      TRK00100
      DATA B1/.177,.124,.131,-.005,-.005,.015,                           TRK00110
     *        -.036,.106,.149,-.03,-.03,.03,                             TRK00120
C             .172,.016,.008,.02,.02,.023       /                      TRK00130
      DATA B2/-.065,-.01,-.047,-.014,-.014,-.006,                        TRK00140
     *        .016,-.024,-.045,.043,.043,.003,                           TRK00150
C             -.054,-.003,-.012,.002,.002,.001  /                      TRK00160
C                                                                        TRK00170
      DATA INDXAR/19*1,4*2,22*3/                                         TRK00180
C                                                                        TRK00190
      DO 100 IMY=1,20                                                    TRK00200
C                                                                        TRK00210
         MY = CY - (20-IMY) - 50                                         TRK00220
         IX=INDXAR(MY)                                                   TRK00230
C                                                                        TRK00240
      DO 100 IPOL = 1,3                                                  TRK00250
C                                                                        TRK00260
      TRKRET(IMY,IPOL,1) = B0(IX,1,IPOL) + B1(IX,1,IPOL)*HGWGT*.001 +    TRK00270
     *                     B2(IX,1,IPOL)*HGWGT/HGCID                   TRK00280
C                                                                        TRK00290
      TRKRET(IMY,IPOL,2) = B0(IX,2,IPOL) + B1(IX,2,IPOL)*HDWGT*.001 +    TRK00300
     *                     B2(IX,2,IPOL)*HDWGT/HDCID                   TRK00310
C                                                                        TRK00320
100   CONTINUE                                                           TRK00330
C                                                                        TRK00340
      RETURN                                                             TRK00350
C     DEBUG SUBCHK                                                       TRK00360
      END                                                                TRK00370
                                                                         TRK00380
                                                                         TRK00390
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      SUBROUTINE PTHWY(REP1,SEP1,REP2,SEP2,H,WIDTH,CNTR,XNL,QLS,          PTH00010
     1CUT,WIDTC,THETA,U,HL,XKST,GS,N,XXRR,XXSR,Z,CON,IPRSW)               PTH00020
C         HIWAY - NEW VERSION - JUNE 1974                                 PTH00030
C                                                                         PTH00040
C      IF IPRSW = 0   NO OUTPUT IS GENERATED                              PTH00050
C      IF IPRSW = 1   ONLY THE CONCENTRATIONS ARE PRINTED                 PTH00060
C      IF IPRSW = 2 ALL HIWAY OUTPUT IS PRINTED                           PTH00070
C                                                                         PTH00080
      COMMON /SOL/ QLN(25),HLN(25), RAQ(25),SAQ(25),RBQ(25),SBQ(25),      PTH00090
     *SYQN,SZQN                                                           PTH00100
      COMMON /REC/ RR(51),SR(51),ZR(51)                                   PTH00110
      DIMENSION XXRR(1),XXSR(1),Z(1),QLS(1),CON(1)                        PTH00120
      IVERS=75128                                                         PTH00130
      IWPI = 6                                                            PTH00140
C         FORM OF INPUT TO HIWAY (BATCH)                                  PTH00150
C                                                                         PTH00160
C     VARIABLE                                                            PTH00170
C      NAME                                                               PTH00180
C           COLUMNS                                                       PTH00190
C                 FORMAT                                                  PTH00200
C                       FORM      VARIABLE                                PTH00210
C                                                          UNITS          PTH00220
C  CARD TYPE 1 (1 CARD) HEADER OR TITLE CARD                               PTH00230
C     HEAD  1-80 20A4   AAAA          ALPHANUMERIC DATA FOR HEADING.      PTH00240
C                                                                         PTH00250
C  CARD TYPE 2 (1 CARD) SOURCE CARD                                        PTH00260
C     REP1   1-10 F10.0 XXXX.XXX EAST  COORD.,POINT 1      (MAP UNITS)PTH00270
C     SEP1  11-20 F10.0 XXXX.XXX NORTH COORD.,POINT 1      (MAP UNITS)PTH00280
C     REP2  21-30 F10.0 XXXX.XXX EAST  COORD.,POINT 2      (MAP UNITS)PTH00290
C     SEP2  31-40 F10.0 XXXX.XXX NORTH COORD.,POINT 2      (MAP UNITS)PTH00300
C     H     41-50 F10.0 XX.X     HEIGHT OF LINE SOURCE         (METERS)PTH00310
C     WIDTH 51-60 F10.0 XX.      TOTAL WIDTH OF HIWAY          (METERS)PTH00320
C     CNTR  61-70 F10.0 XX.      WIDTH OF CENTER STRIP (MEDIAN) (METERS)PTH00330
C     XNL   71-80 F10.0 X.       NUMBER OF TRAFFIC LANES (DIMENSIONLESS)PTH00340
C                                                                         PTH00350
C  CARD TYPE 3 (UP TO 3 CARDS) EMISSIONS FOR EACH LANE.                   PTH00360
C       LANES ORDERED LEFT TO RIGHT WHEN LOOKING FROM POINT 1 TO POINT 2PTH00370
C     QLS    1-80 F10.0 .XXXXXXXXX EMISSION RATE FOR EACH LANE (G/SEC-M)PTH00380
C                                                                         PTH00390
                                                                          PTH00400
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C   CARD TYPE 4 (1 CARD) AT-GRADE OR CUT? (CAN BE BLANK FOR AT-GRADE)     PTH00410
C      CUT     1-10 F10.0 X.       1. IF CUT; 0. IF AT-GRADE(DIMENSIONLESS)PTH00420
C      WIDTC 11-20 F10.0 XX.       WIDTH AT TOP OF CUT SECTION     (METERS)PTH00430
C                                                                           PTH00440
C   CARD TYPE 5 (1 CARD) METEOROLOGICAL CARD                                PTH00450
C      THETA   1-10 F10.0 XXX.     WIND DIRECTION                 (DEGREES)PTH00460
C      U      11-20 F10.0 XX.X     WIND SPEED                      (METERS)PTH00470
C      HL     21-30 F10.0 XXXX.    HEIGHT OF MIXING LAYER          (METERS)PTH00480
C      XKST   31-40 F10.0 X.       PASQUILL STABILITY CLASS(DIMENSIONLESS)PTH00490
C                                                                           PTH00500
C   CARD TYPE 6 (1 CARD) SCALE FACTOR (MAP UNITS TIMES SCALE FACTOR = KM)PTH00510
C      GS      1-10 F10.0 X.XXXX   SCALE FACTOR                           PTH00520
C   CARD TYPE 7 (UP TO 50 CARDS) RECEPTOR CARDS                           PTH00530
C      XXRR    1-10 F10.0 XXXX.XXX EAST  COORD. OF RECEPTOR    (MAP UNITS)PTH00540
C      XXSR   11-20 F10.0 XXXX.XXX NORTH COORD. OF RECEPTOR    (MAP UNITS)PTH00550
C      Z      21-30 F10.0 X.XX     HEIGHT OF RECEPTOR (ABOVE GROUND) (METEPTH00560
C                                                                           PTH00570
C                                                                           PTH00580
C         READ HEADER CARD                                                  PTH00590
C  10 READ(IRD,500,END=190)HEAD                                             PTH00600
C 500 FORMAT(20A4)                                                         PTH00610
C      WRITE(IWRI,510)HEAD                                                 PTH00620
C 510 FORMAT('0',/,20A4,/)                                                 PTH00630
C      WRITE(IWRI,520)IVERS                                                PTH00640
C 520 FORMAT('0  HIWAY VERSION:',16)                                       PTH00650
C      READ(IRD,540,END=190) REP1,SEP1,REP2,SEP2,H,WIDTH,CNTR,XNL          PTH00660
540    FORMAT(8F10.0)                                                      PTH00670
C         REP1,SEP1 ARE THE COORDINATES OF AN END POINT OF THE LINE        PTH00680
C          SOURCE IN SOURCE COORDINATES.                                   PTH00690
C         REP2,SEP2 ARE THE COORDINATES OF THE OTHER END POINT OF THE      PTH00700
C          LINE SOURCE IN SOURCE COORDINATES.                              PTH00710
C         H IS THE EFFECTIVE EMISSION HEIGHT OF THE SOURCE IN METERS.      PTH00720
C         WIDTH IS THE HIGHWAY WIDTH (M) FOR AT GRADE                      PTH00730
C         CNTR IS THE WIDTH OF THE CENTER STRIP (M)                        PTH00740
C         XNL IS THE NUMBER OF LANES FOR THE AT-GRADE HIGHWAY.             PTH00750
      IF(IPRSW.GE.2) WRITE(IWRI,550)REP1,SEP1,REP2,SEP2                    PTH00760
550    FORMAT(' ENDPOINTS OF THE LINE SOURCE',/,                           PTH00770
     *F9.3,',',F9.3,' AND',F9.3,',',F9.3)                                  PTH00780
      NL=XNL                                                               PTH00790
      IF(IPRSW.GE.2) WRITE(IWRI,560)H                                      PTH00800
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  560   FORMAT (' EMISSION HEIGHT IS',F8.3,' METERS')                    PTH00810
        IF(IPRSW.GE.2) WRITE(IWRI,570) NL                                PTH00820
  570   FORMAT(' EMISSION RATE (GRAMS/SECOND*METER) OF',I4,' LANE(S)')   PTH00830
C       READ(IRD,540)(QLS(I),I=1,NL)                                     PTH00840
C          QLS IS THE LINE SURCE STRENGTH (GRAMS/SECOND*METER)           PTH00850
        IF(IPRSW.GE.2) WRITE(IWRI,580)(QLS(I),I=1,NL)                    PTH00860
  580   FORMAT(8E12.3)                                                   PTH00870
C       READ(IRD,540)CUT,WIDTC                                           PTH00880
C           CUT SECTION.                                                 PTH00890
C           WIDTC IS THE WIDTH OF THE TOP OF THE CUT SECTION (M)         PTH00900
        IF(CUT.EQ.0.)GOTO40                                              PTH00910
C          DQLS IS THE CUT SECTION SOURCE STRENGTH                       PTH00920
        DQLS=0.                                                          PTH00930
        DO 20 I=1,NL                                                     PTH00940
   20   DQLS=DQLS+QLS(I)                                                 PTH00950
        XNDL=10.                                                         PTH00960
        NL=XNDL                                                          PTH00970
        DQLS=DQLS/XNDL                                                   PTH00980
        IF(IPRSW.GE.2) WRITE(IWRI,590)WIDTC                              PTH00990
  590   FORMAT(' WIDTH OF TOP OF CUT SECTION IS',F10.3,' M')             PTH01000
        DO30I=1,NL                                                       PTH01010
   30   QLS(I)=DQLS                                                      PTH01020
        WIDTH=WIDTC                                                      PTH01030
        XNL=XNDL                                                         PTH01040
        CNTR=0.                                                          PTH01050
        GOTO50                                                           PTH01060
   40   IF(IPRSW.GE.2) WRITE(IWRI,600)WIDTH,CNTR                         PTH01070
  600   FORMAT(' WIDTH OF AT-GRADE HIGHWAY IS',F10.1,' M',/,             PTH01080
     *' WIDTH OF CENTER STRIP IS',F10.1,' M')                            PTH01090
C  50 READ(IRD,540) THETA,U,HL,XKST                                      PTH01100
   50   CONTINUE                                                         PTH01110
        KST=XKST                                                         PTH01120
C          THETA IS THE WIND DIRECTION IN DEGREES.                       PTH01130
C          U IS THE WIND SPEED IN METERS PER SECOND.                     PTH01140
C          KST IS THE STABILITY CLASS                                    PTH01150
C          HL IS THE HEIGHT OF THE LIMITING LID                          PTH01160
   60   IF(IPRSW.GE.2) WRITE (IWRI,610) THETA,U,KST,HL                   PTH01   0
  610   FORMAT (' WIND DIRECTION IS',F7.0,'  DEGREES',/,' WIND SPEED IS', PTH01180
     *F7.1,' METERS/SEC'/' STABILITY CLASS IS',I5,/,' HEIGHT OF LIMITING PTH01190
     * LID IS',F8.1,' METERS')                                          PTH01200
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C     READ(IRD,540)GS                                                    PTH01210
C        GS IS THE MEASURE BETWEEN COORDINATES (KM).                     PTH01220
      IF(IPRSW.GE.2) WPITE(IWRI,620)GS                                   PTH01230
620   FORMAT(' THE SCALE OF THE COORDINATE AXES IS ',F10.4,' KM/USER UNIPTH01240
     *TS.'//)                                                           PTH01250
      IF(IPRSW.GE.1) WPITE(IWRI,630)                                     PTH01260
630   FORMAT(1HO,'  RECEPTOR LOCATION      HEIGHT      CONCENTRATION',/, PTH01270
     * '       X',10X,'Y              Z(M)    UGM/METER**3      PPM *')  PTH01280
      RA=REP1*GS                                                         PTH01290
      RB=REP2*GS                                                         PTH01300
      SA=SEP1*GS                                                         PTH01310
      SB=SEP2*GS                                                         PTH01320
      WL= (WIDTH-CNTR)/XNL                                               PTH01330
      IF(CUT.GT.0.) GO TO 80                                             PTH01340
70    SYON=3.                                                            PTH01350
      SZON=1.5                                                           PTH01360
      GO TO 100                                                          PTH01370
80    IF(U.GT.3.)GO TO 70                                                PTH01380
      IF(U.LT.1.) GO TO 90                                               PTH01390
      DUM=(U-1.)/2.                                                      PTH01400
      SYON=10.-7.*DUM                                                    PTH01410
      SZON=5.-3.5*DUM                                                    PTH01420
      GO TO 100                                                          PTH01430
90    SYON=10.                                                           PTH01440
      SZON=5.                                                            PTH01450
100   CONTINUE                                                           PTH01460
      IF(NL.EQ.1) WL=0.                                                  PTH01470
      IF(NL.EQ.1) CNTR=0.                                                PTH01480
      DELR=RB-RA                                                         PTH01490
      DELS=SB-SA                                                         PTH01500
      DIST=SQRT(DELS*DELS+DELR*DELR)                                     PTH01510
      NLIM=NL/2                                                          PTH01520
      ALIM=NLIM                                                          PTH01530
      DO 110 ID=1,NLIM                                                   PTH01540
      A=ID                                                               PTH01550
      DL=(-0.5)*CNTR+((-1)*ALIM-0.5+A)*WL                                PTH01560
      DUM=DL*0.001/DIST                                                  PTH01570
      RAO(ID)=RA+DELS*DUM                                                PTH01580
      RBO(ID)=RB+DELS*DUM                                                PTH01590
      SAO(ID)=SA-DELR*DUM                                                PTH01600
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      SBQ(ID)=SB-DELR*DUM                                              PTH01610
      QLN(ID)=QLS(ID)                                                  PTH01620
      HLN(ID)=H                                                        PTH01630
  110 CONTINUE                                                         PTH01640
      NS=NLIM+1                                                        PTH01650
      AS=NS                                                            PTH01660
      DO 120 ID=NS,NL                                                  PTH01670
      A=ID                                                             PTH01680
      DL=0.5*CNTR+(0.5+A-AS)*WL                                        PTH01690
      DUM=DL*0.001/DIST                                                PTH01700
      RAQ(ID)=RA+DELS*DUM                                              PTH01710
      RBQ(ID)=RB+DELS*DUM                                              PTH01720
      SAQ(ID)=SA-DELR*DUM                                              PTH01730
      SBQ(ID)=SB-DELR*DUM                                              PTH01740
      QLN(ID)=QLS(ID)                                                  PTH01750
      HLN(ID)=H                                                        PTH01760
  120 CONTINUE                                                         PTH01770
      K=NL                                                             PTH01780
      ICHK=1                                                           PTH01790
C     N=1                                                              PTH01800
C 130 READ(IRD,540,END=150)XXRR(N),XXSR(N),Z(N)                        PTH01810
C     IF(XXRR(N).GE.9999.)GO TO 170                                    PTH01820
C150  ICHK=2                                                           PTH01830
C     GO TO 170                                                        PTH01840
C     N=N+1                                                            PTH01850
C     GO TO 130                                                        PTH01860
C 170 N=N-1                                                            PTH01870
  160 CONTINUE                                                         PTH01880
      DO 180 IDUM=1,N                                                  PTH01890
      RR(IDUM)=XXRR(IDUM)*GS                                           PTH01900
      SR(IDUM)=XXSR(IDUM)*GS                                           PTH01910
      ZR(IDUM)=Z(IDUM)                                                 PTH01920
180   CON(IDUM)=0.                                                     PTH01930
C     K IS NUMBER OF LINE SOURCES                                      PTH01940
C     N IS NUMBER OF RECEPTORS                                         PTH01950
      CALL DBTLNE(K,N,THETA,U,KST,HL,CON)                              PTH01960
      IF(IPRSW.LT.1) GO TO 1000                                        PTH01970
      DO 211 NC=1,N                                                    PTH01980
      CLSS=0.00087*CON(NC)                                             PTH01990
      WRITE(IWR1,300)XXRR(NC),XXSR(NC),ZP(NC),CON(NC),CLSS             PTH02000
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  300 FORMAT(1H ,3(F10.4,2X),F10.0,F10.3)                                PTH02010
  211 CONTINUE                                                           PTH02020
      WRITE(IWRI,650)                                                    PTH02030
650   FORMAT(1HO,'*  PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLYPTH02040
     *.')                                                                PTH02050
C     GO TO (10,190),ICHK                                                PTH02060
C 190 CALL EXIT                                                          PTH02070
 1000 CONTINUE                                                           PTH02080
      RETURN                                                             PTH02090
      END                                                                PTH02100
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      SUBROUTINE DBTLNE(NQ,NR,THETA,U,KST,HL,CON)                        DBL00010
      COMMON /SOL/ QLN(25),HLN(25),RAQ(25),SAQ(25),RBQ(25),SBQ(25),      DBL00020
     *SYON,SZON                                                          DBL00030
      COMMON /REC/ RR(51),SR(51),ZR(51)                                  DBL00040
      DIMENSION XST(11),YST(11),CON(1)                                   DBL00050
C     X(R,S) = (R-RREC)*SINT + (S-SREC)*COST                             DBL00060
C        X IS UPWIND DISTANCE OF R,S FROM RREC,SREC                      DBL00070
C     Y(R,S) = (S-SREC)*SINT - (R-RREC)*COST                             DBL00080
C        Y IS CROSSWIND DISTANCE OF R,S FROM RREC,SREC                   DBL00090
      IWRI=6                                                             DBL00100
      TR = THETA/57.2958                                                 DBL00110
      SINT = SIN(TR)                                                     DBL00120
      COST = COS(TR)                                                     DBL00130
      PIN=0.05                                                           DBL00140
      UZ=U                                                               DBL00150
      XVYL=XVY(SYON,KST)                                                 DBL00160
      XVZL=XVZ(SZON,KST)                                                 DBL00170
C---CALCULATE CONCENTRATIONS FOR EACH RECPTOR.                            DBL00180
      DO 465 NC=1,NR                                                     DBL00190
      RREC=RR(NC)                                                        DBL00200
      SREC=SR(NC)                                                        DBL00210
      Z=ZR(NC)                                                           DBL00220
C---SUM CONCENTRATIONS OVER EACK LANE.                                   DBL00230
      DO 470 NS=1,NQ                                                     DBL00240
      R1 = RAQ(NS)                                                       DBL00250
      S1 = SAQ(NS)                                                       DBL00260
      R2 = RBQ(NS)                                                       DBL00270
      S2 = SBQ(NS)                                                       DBL00280
      QL = QLN(NS)                                                       DBL00290
      H = HLN(NS)                                                        DBL00300
      X1 = X(R1,S1)                                                      DBL00310
      X2 = X(R2,S2)                                                      DBL00320
      IF(X1)35,45,45                                                     DBL00330
35    IF(X2)40,45,45                                                     DBL00340
40    RC = 0.                                                            DBL00350
      GO TO 470                                                          DBL00360
45    IF(X1-100.)46,46,47                                                DBL00370
46    IF(X2-100.)49,49,47                                                DBL00380
47    WRITE(IWRI,48)                                                     DBL00390
48    FORMAT(1HO,'RECEPTOR IS 100KM OR MORE FROM SOURCE')                DBL00400
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      GO TO 465                                                          DBL00410
   49 DELR = R2 - R1                                                     DBL00420
      DELS = S2 - S1                                                     DBL00430
      Y1 = Y(R1,S1)                                                      DBL00440
      Y2 = Y(R2,S2)                                                      DBL00450
      IF(Y1-Y2) 100,255,100                                              DBL00460
C        IF Y1 = Y2, LINE SOURCE IS PARALLEL TO UPWIND AZIMUTH FROM RECEDBL00470
  100 IF(COST + 0.0001)135,105,105                                       DBL00480
  105 IF(COST - 0.0001)110,110,135                                       DBL00490
  110 IF(DELR + 0.0001)125,115,115                                       DBL00500
  115 IF(DELR - 0.0001) 120,120,125                                      DBL00510
  120 SLOC = SREC                                                        DBL00520
      RLOC = R1                                                          DBL00530
      GO TO 200                                                          DBL00540
  125 SLP = DELS/DELR                                                    DBL00550
      IF(SLP)130,255,130                                                 DBL00560
  130 SLOC = SREC                                                        DBL00570
      RLOC = (SLOC - S1)/SLP + R1                                        DBL00580
      GO TO 200                                                          DBL00590
  135 IF(SINT + 0.0001)160,140,140                                       DBL00600
  140 IF(SINT - 0.0001)145,145,160                                       DBL00610
  145 IF(DELR + 0.0001)155,150,150                                       DBL00620
  150 IF(DELR - 0.0001)255,255,155                                       DBL00630
  155 SLP = DELS/DELR                                                    DBL00640
      RLOC = RREC                                                        DBL00650
      SLOC = SLP * (RLOC - R1) + S1                                      DBL00660
      GO TO 200                                                          DBL00670
  160 IF(DELR + 0.0001)175,165,165                                       DBL00680
  165 IF(DELR - 0.0001)170,170,175                                       DBL00690
  170 RLOC = R1                                                          DBL00700
      SLOC = (RLOC - RREC) * COST/SINT + SREC                            DBL00710
      GO TO 200                                                          DBL00720
  175 IF(DELS + 0.0001)190,180,180                                       DBL00730
  180 IF(DELS - 0.0001)185,190,190                                       DBL00740
  185 SLOC = S1                                                          DBL00750
      RLOC = (SLOC - SREC) * SINT/COST + RREC                            DBL00760
      GO TO 200                                                          DBL00770
  190 TATH = SINT/COST                                                   DBL00780
C        TATH IS TANGENT (THETA)                                         DBL00790
      SLP = DELS/DELR                                                    DBL00800
```

```
C          SLP IS SLOPE OF LINE SOURCE.
      RLOC = (RREC/TATH + S1 - SLP*R1 - SREC)/(1./TATH - SLP)
      SLOC = (RLOC - RREC)/TATH + SREC
C          RLOC, SLOC IS LOCUS OF UPWIND VECTOR FROM RECEPTOR AND LINEAR
C             EXTENSION OF LINE SOURCE.
200   XLOC = X(RLOC,SLOC)
      IF (XLOC)255,255,205
C          XLOC IS POSITIVE IF LOCUS IS UPWIND.
205   IF(S2-S1)210,210,215
210   SMAX = S1
      SMIN = S2
      GO TO 220
215   SMAX = S2
      SMIN = S1
220   IF(R2-R1)225,225,230
225   RMAX = R1
      RMIN = R2
      GO TO 235
230   RMAX = R2
      RMIN = R1
C          SEE IF UPWIND LOCUS IS ON LINE SOURCE.
235   IF(RLOC-RMIN)255,240,240
240   IF(RMAX-RLOC)255,245,245
245   IF(SLOC-SMIN)255,250,250
250   IF(SMAX-SLOC)255,260,260
255   INDIC = 1
C          INDIC =1 FOR NO LOCUS ON LINE SOURCE.
      XA = X1
      YA = Y1
      XB = X2
      YB = Y2
      GO TO 300
260   INDIC = 2
C          INDIC =2 FOR LOCUS ON LINE SOURCE.
      XA = X1
      YA = Y1
      XB = XLOC
      YB = 0.
300   DISX = XB - XA
      DISY = YB - YA
```

```
      DISI = SQRT (DISX*DISX + DISY*DISY)                              DBL01210
C        DISI IS LENGTH(KM) OF LINE CONSIDERED.                        DBL01220
      IF(DISI)310,305,310                                              DBL01230
305   CURR = 0.                                                        DBL01240
      GO TO 435                                                        DBL01250
310   DDI = DISI*1000./20.                                             DBL01260
C        ONE-HALF IS INCLUDED IN THE 20.                               DBL01270
C        DDI IS ONE-HALF TIMES 1/10 OF DISI (M).                       DBL01280
      DX = DISX/10.                                                    DBL01290
      DY = DISY/10.                                                    DBL01300
      PREV =0.                                                         DBL01310
      KNTRL = 1                                                        DBL01320
      XI = XA                                                          DBL01330
      YI = YA                                                          DBL01340
      KNT = 0                                                          DBL01350
      DO 355 I = 1,11                                                  DBL01360
C        STORE EACH XI,YI.                                             DBL01370
      XST(I) = XI                                                      DBL01380
      YST(I) = YI                                                      DBL01390
      IF(XST(I)) 311,311,312                                           DBL01400
311   RC=0.                                                            DBL01410
      GOTO313                                                          DBL01420
312   XZ = XI + XVZL                                                   DBL01430
      XY = XI + XVYL                                                   DBL01440
      CALL DBTRCX(UZ,Z,H,HL,XZ,XY,YI,KST,AN,M,SY,SZ,RC)                DBL01450
313   GO TO(315,335),KNTRL                                             DBL01460
C        IF RC IS ZERO, CONTINUE UNTIL RC IS POSITIVE.                 DBL01470
315   IF(RC)350,350,320                                                DBL01480
320   IF(I-1)325,325,330                                               DBL01490
325   KNTRL = 2                                                        DBL01500
      GO TO 345                                                        DBL01510
C        RESET POINT A TO LAST ONE PREVIOUS.                           DBL01520
330   XA = XST(I-1)                                                    DBL01530
      YA = YST(I-1)                                                    DBL01540
      KNTRL = 2                                                        DBL01550
      GO TO 345                                                        DBL01560
335   IF(RC)340,340,345                                                DBL01570
C        RESET POINT B IF REACH ZERO CONCENTRATION.                    DBL01580
340   XB = XI                                                          DBL01590
      YB = YI                                                          DBL01600
```

```
      GO TO 360                                                          DBL01610
345   KNT = KNT + 1                                                      DBL01620
350   XI = XI + DX                                                       DBL01630
      YI = YI + DY                                                       DBL01640
355   CONTINUE                                                           DBL01650
360   IF(KNT)370,370,365                                                 DBL01660
365   IF(KNT-6)300,300,390                                               DBL01670
C        IF GET TO 370, CONC. FROM THIS SEGMENT IS 0.                    DBL01680
370   GO TO (375,380,385),INDIC                                          DBL01690
375   RC = 0.                                                            DBL01700
      GO TO 470                                                          DBL01710
380   FIRST = 0.                                                         DBL01720
      GO TO 450                                                          DBL01730
385   RC = FIRST                                                         DBL01740
      GO TO 460                                                          DBL01750
390   CONTINUE                                                           DBL01760
C        DO  A TRAPEZOIDAL INTEGRATION FROM A TO B IN TEN STEPS.         DBL01770
C        IT IS LIKELY THAT A OR B HAVE BEEN REDEFINED.                   DBL01780
400   DISX = XB-XA                                                       DBL01790
      DISY = YB-YA                                                       DBL01800
      DISI = SQRT(DISX*DISX + DISY*DISY)                                 DBL01810
C        DISI IS DISTANCE(KM) FROM A TO B                                DBL01820
      DELD = DISI*100.                                                   DBL01830
C        DELD IS 1/10 DISI IN METERS.                                    DBL01840
      DX = DISX/10.                                                      DBL01850
      DY = DISY/10.                                                      DBL01860
      SUM = 0.                                                           DBL01870
      XDUM = XA                                                          DBL01880
      YDUM = YA                                                          DBL01890
      IF(XDUM.LE.0.) GOTO404                                             DBL01900
      XZ = XDUM + XVZL                                                   DBL01910
      XY = XDUM + XVYL                                                   DBL01920
      CALL DBTRCX(UZ,Z,H,HL,XZ,XY,YDUM,KST,AN,M,SY,SZ,RC)                DBL01930
      SUM = SUM + RC/2.                                                  DBL01940
404   DO 405 I = 1,9                                                     DBL01950
      XDUM = XDUM + DX                                                   DBL01960
      YDUM = YDUM + DY                                                   DBL01970
      IF(XDUM.LE.0.) GOTO405                                             DBL01980
      XZ = XDUM + XVZL                                                   DBL01990
      XY = XDUM + XVYL                                                   DBL02000
```

```
      CALL DBTRCX(UZ,Z,H,HL,XZ,XY,YDUM,KST,AN,M,SY,SZ,RC)                DBL02010
      SUM = SUM + RC                                                    DBL02020
405   CONTINUE                                                          DBL02030
      XDUM = XDUM + DX                                                  DBL02040
      YDUM = YDUM + DY                                                  DBL02050
      IF(XDUM.LE.0.) GOTO411                                            DBL02060
      XZ = XDUM + XVZL                                                  DBL02070
      XY = XDUM + XVYL                                                  DBL02080
      CALL DBTRCX(UZ,Z,H,HL,XZ,XY,YDUM,KST,AN,M,SY,SZ,RC)               DBL02090
      SUM = SUM + RC/2.                                                 DBL02100
C        INTEGRATED VALUE IS CURR.                                      DBL02110
411   CURR = SUM * DELD                                                 DBL02120
      ILIM = 10                                                         DBL02130
C     FIRST ESTIMATE COMPLETED HERE.                                    DBL02140
410   PREV = CURR                                                       DBL02150
C        EVALUATE FOR POINTS IN BETWEEN THOSE ALREADY EVALUATED.        DBL02160
      DELD = DELD/2.                                                    DBL02170
      XDUM = XA + DX/2.                                                 DBL02180
      YDUM = YA + DY/2.                                                 DBL02190
      DO 415 I = 1,ILIM                                                 DBL02200
      IF(XDUM.LE.0.) GOTO414                                            DBL02210
      XZ = XDUM + XVZL                                                  DBL02220
      XY = XDUM + XVYL                                                  DBL02230
      CALL DBTRCX(UZ,Z,H,HL,XZ,XY,YDUM,KST,AN,M,SY,SZ,RC)               DBL02240
C        NOTE ADD THESE TO RC'S FOUND ABOVE.                            DBL02250
      SUM = SUM + RC                                                    DBL02260
414   XDUM = XDUM + DX                                                  DBL02270
415   YDUM = YDUM + DY                                                  DBL02280
      CURR = SUM * DELD                                                 DBL02290
C    SECOND ESTIMATE COMPLETED HERE. ALSO FOURTH,SIXTH,ETC.             DBL02300
      TEST = ABS((CURR-PREV)/CURR)                                      DBL02310
C        IF WITHIN PIN OF LAST VALUE (PREV), CONSIDER THIS AS FINAL VALUDBL02320
      IF(TEST-PIN)435,420,420                                           DBL02330
420   ILIM = ILIM * 2                                                   DBL02340
      PREV = CURR                                                       DBL02350
C        EVALUATE POINTS IN BETWEEN.                                    DBL02360
      DELD = DELD/2.                                                    DBL02370
      DX = DX/2.                                                        DBL02380
      DY = DY/2.                                                        DBL02390
      XDUM = XA + DX/2.                                                 DBL02400
```

```
      YDUM = YA + DY/2.                                                  DBL02410
      DO 425 I = 1,ILIM                                                  DBL02420
      IF(XDUM.LE.0.) GOTO424                                             DBL02430
      XZ = XDUM + XVZL                                                   DBL02440
      XY = XDUM + XVYL                                                   DBL02450
      CALL DBTRCX(UZ,Z,H,HL,XZ,XY,YDUM,KST,AN,M,SY,SZ,PC)                DBL02460
      SUM = SUM + RC                                                     DBL02470
424   XDUM = XDUM +DX                                                    DBL02480
425   YDUM = YDUM +DY                                                    DBL02490
      CURR = SUM * DELD                                                  DBL02500
C        THIRD ESTIMATE COMPLETED HERE. ALSO FIFTH,SEVENTH, ETC.         DBL02510
      TEST = ABS((CURR-PREV)/CURR)                                       DBL02520
      IF (TEST-PIN)435,430,430                                           DBL02530
430   ILIM = ILIM * 2                                                    DBL02540
      IF(ILIM.GT.2000) GO TO 435                                         DBL02550
      DX = DX/2.                                                         DBL02560
      DY = DY/2.                                                         DBL02570
      GO TO 410                                                          DBL02580
C        AT 435 HAVE FINAL VALUE OF INTEGRATION IN CURR.                 DBL02590
435   GO TO (440,445,455),INDIC                                          DBL02600
440   RC = CURR                                                          DBL02610
      GO TO 460                                                          DBL02620
445   FIRST = CURR                                                       DBL02630
450   INDIC = 3                                                          DBL02640
      XA = XLOC                                                          DBL02650
      YA = 0.                                                            DBL02660
      XB = X2                                                            DBL02670
      YB = Y2                                                            DBL02680
      GO TO 300                                                          DBL02690
455   RC = FIRST + CURR                                                  DBL02700
460   CON(NC)=CON(NC)+RC*QL                                              DBL02710
470   CONTINUE                                                           DBL02720
      CON(NC)=1.0E+6*CON(NC)                                             DBL02730
465   CONTINUE                                                           DBL02740
      RETURN                                                             DBL02750
      END                                                                DBL02760
```

```
      SUBROUTINE DBTRCX (U,Z,H,HL,X,XY,Y,KST,AN,M,SY,SZ,RC)
C        THIS IS THE 1972 VERSION OF DBTRCX.
C        D. B. TURNER, RESEARCH METEOROLOGIST* MODEL DEVELOPMENT BRANCH,
C         DIVISION OF METEOROLOGY, ENVIRONMENTAL PROTECTION AGENCY.
C           ROOM 314B, NCHS BUILDING, RTP. PHONE (919) 549-8411 EXT 4564
C          MAILING ADDRESS- DM. EPA. RESEARCH TRIANGLE PARK, NC 27711
C         * ON ASSIGNMENT FROM NATIONAL OCEANIC AND ATMOSPHERIC
C              ADMINISTRATION, DEPARTMENT OF COMMERCE.
C        SUBROUTINE DBTRCX CALCULATES CHI/Q CONCENTRATION VALUES. DBTRCX
C         CALLS UPON SUBROUTINE DBTSIG TO OBTAIN STANDARD DEVIATIONS.
C        THE INPUT VARIABLES ARE....
C          U     WIND SPEED (M/SEC)
C          Z     RECEPTOR HEIGHT (M)
C          H     EFFECTIVE STACK HEIGHT (M)
C          HL=L  HEIGHT OF LIMITING LID (M)
C          X     DISTANCE RECEPTOR IS DOWNWIND OF SOURCE (KM)
C          XY    X+VIRTUAL DISTANCE USED FOR AREA SOURCE APPROX. (KM)
C          Y     DISTANCE RECEPTOR IS CROSSWIND FROM SOURCE (KM)
C          KST   STABILITY CLASS
C        THE OUTPUT VARIABLES ARE....
C          AN    THE NUMBER OF TIMES THE SUMMATION TERM IS EVALUATED
C                AND ADDED IN.
C          RC    RELATIVE CONCENTRATION (SEC/M**3)
C        THE FOLLOWING EQUATION IS SOLVED --
C          RC = (1/(2*PI*U*SIGMA Y*SIGMA Z))* (EXP(-0.5*(Y/SIGMA Y)**2))
C           (EXP(-0.5*((Z-H)/SIGMA Z)**2) + EXP(-0.5*((Z+H)/SIGMA Z)**2)
C             PLUS THE SUM OF THE FOLLOWING 4 TERMS K TIMES (N=1,K) --
C              TERM 1- EXP(-0.5*((Z-H-2NL)/SIGMA Z)**2)
C              TERM 2- EXP(-0.5*((Z+H-2NL)/SIGMA Z)**2)
C              TERM 3- EXP(-0.5*((Z-H+2NL)/SIGMA Z)**2)
C              TERM 4- EXP(-0.5*((Z+H+2NL)/SIGMA Z)**2)
C        THE ABOVE EQUATION IS SIMILAR TO EQUATION (5.8) P 36 IN
C         WORKBOOK OF ATMOSPHERIC DISPERSION ESTIMATES WITH THE ADDITION
C         OF THE EXPONENTIAL INVOLVING Y.
C        IWRI IS CONTROL CODE FOR OUTPUT
      IWRI = 6
C        IF THE SOURCE IS ABOVE THE LID, SET RC = 0.. A   RETURN.
      IF (H-HL)302,302,304
  302 IF (Z-HL)300,300,30
  304 IF (Z-HL)30,306,306
```

```
  306 WRITE(IWRI, 307)                                                    DBX00410
  307 FORMAT (1HO,'BOTH H AND Z ARE ABOVE THE MIXING HEIGHT SO A RELIABLDBX00420
     1E COMPUTATION CAN NOT BE MADE.')                                    DBX00430
      RC=0.                                                               DBX00440
      RETURN                                                              DBX00450
C       IF X IS LESS THAN 1 METER. SET RC=0. AND RETURN.  THIS AVOIDS     DBX00460
C        PROBLEMS OF INCOPRECT VALUES NEAR THE SOURCE.                    DBX00470
  300 IF(X-0.001)30,310,310                                               DBX00480
C       CALL DBTSIG TO OBTAIN VALUES FOR SY AND SZ                        DBX00490
  310 CALL DBTSIG (X,XY,KST,SY,SZ)                                        DBX00500
C         SY = SIGMA Y. THE STANDARD DEVIATION OF CONCENTRATION IN THE    DBX00510
C         Y-DIRECTION (M)                                                 DBX00520
C         SZ = SIGMA Z. THE STANDARD DEVIATION OF CONCENTRATION IN THE    DBX00530
C         Z-DIRECTION (M)                                                 DBX00540
      C1 = 1.                                                             DBX00550
      IF (Y)5,400,5                                                       DBX00560
    5 YD = 1000. * Y                                                      DBX00570
C       YD IS CROSSWIND DISTANCE IN METERS.                               DBX00580
      DUM = YD/SY                                                         DBX00590
      TEMP = 0.5*DUM*DUM                                                  DBX00600
      IF (TEMP-50.)6,30,30                                                DBX00610
    6 C1 = EXP(TEMP)                                                      DBX00620
  400  IF(KST-4)401,401,403                                               DBX00630
  401 IF(HL-5000.)7,403,403                                               DBX00640
C       IF STABLE CONDITION OR UNLIMITED MIXING HEIGHT.                   DBX00650
C        USE EQUATION 3.2 IF Z = 0. OR EQ 3.1 FOR NON-ZERO Z.             DBX00660
  403 C2 = 2.*SZ*SZ                                                       DBX00670
      IF(Z)30,404,406                                                     DBX00680
  404 C3 = H*H/C2                                                         DBX00690
      IF(C3-50.)405,30,30                                                 DBX00700
  405 A2= 1./EXP(C3)                                                      DBX00710
C       WADE EQUATION 3.2.                                                DBX00720
      RC = A2/(3.14159*U*SY*SZ*C1)                                        DBX00730
      M = 1                                                               DBX00740
      RETURN                                                              DBX00750
  406 A2 = 0.                                                             DBX00760
      A3 = 0.                                                             DBX00770
      CA = Z-H                                                            DBX00780
      CB = Z+H                                                            DBX00790
      C3 = CA*CA/C2                                                       DBX00800
```

```
      C4 = CB*CB/C2                                                    DBX00810
      IF(C3-50.)407,408,408                                            DBX00820
  407 A2 = 1./EXP(C3)                                                  DBX00830
  408 IF(C4-50.)409,411,411                                            DBX00840
  409 A3 = 1./EXP(C4)                                                  DBX00850
C        WADE EQUATION 3.1.                                            DBX00860
  411 RC = (A2 + A3)/(6.28318*U*SY*SZ*C1)                              DBX00870
      M = 2                                                            DBX00880
      RETURN                                                           DBX00890
C        IF SIGMA-Z IS GREATER THAN 1.6 TIMES THE MIXING HEIGHT,       DBX00900
C         THE DISTRIBUTION BELOW THE MIXING HEIGHT IS UNIFORM WITH     DBX00910
C         HEIGHT REGARDLESS OF SOURCE HEIGHT.                          DBX00920
    7 IF(SZ/HL - 1.6)9,9,8                                             DBX00930
C        WADE EQUATION 3.5.                                            DBX00940
    8 RC = 1./(2.5066*U*SY*HL*C1)                                      DBX00950
      M = 3                                                            DBX00960
      RETURN                                                           DBX00970
C        INITIAL VALUE OF AN SET = 0.                                  DBX00980
    9 AN = 0.                                                          DBX00990
      IF (Z) 30,340,40                                                 DBX01000
C        STATEMENTS 40 TO 250 CALCULATE RC, THE RELATIVE CONCENTRATION, DBX01010
C         USING THE EQUATION DISCUSSED ABOVE.  SEVERAL INTERMEDIATE     DBX01020
C         VARIABLES ARE USED TO AVOID REPEATING CALCULATIONS.           DBX01030
C         CHECKS ARE MADE TO BE SURE THAT THE ARGUMENT OF THE           DBX01040
C         EXPONENTIAL FUNCTION IS NEVER GREATER THAN 50 (OR LESS THAN   DBX01050
C         -50).  IF 'AN' BECOMES GREATER THAN 45. A LINE OF OUTPUT IS   DBX01060
C         PRINTED INFORMING OF THIS.                                    DBX01070
C        CALCULATE MULTIPLE EDDY REFLECTIONS FOR RECEPTOR HEIGHT Z.     DBX01080
   40 A1 = 1./(6.28318*U*SY*SZ*C1)                                     DBX01090
      C2=2.*SZ*SZ                                                      DBX01100
      A2 = 0.                                                          DBX01110
      A3 = 0.                                                          DBX01120
      CA = Z-H                                                         DBX01130
      CB = Z+H                                                         DBX01140
      C3 = CA*CA/C2                                                    DBX01150
      C4 = CB*CB/C2                                                    DBX01160
      IF (C3-50.)60,80,80                                              DBX01170
   60 A2=1./EXP(C3)                                                    DBX01180
   80 IF(C4-50.)90,110,110                                             DBX01190
   90 A3=1./EXP(C4)                                                    DBX01200
```

```
      110 SUM=0.                                                          DBX01210
          THL = 2.* HL                                                    DBX01220
      120 AN=AN+1.                                                        DBX01230
          A4 = 0.                                                         DBX01240
          A5 = 0.                                                         DBX01250
          A6 = 0.                                                         DBX01260
          A7 = 0.                                                         DBX01270
          C5 = AN*THL                                                     DBX01280
          CC = CA-C5                                                      DBX01290
          CD = CB-C5                                                      DBX01300
          CE = CA+C5                                                      DBX01310
          CF = CB+C5                                                      DBX01320
          C6 = CC*CC/C2                                                   DBX01330
          C7 = CD*CD/C2                                                   DBX01340
          C8 = CE*CE/C2                                                   DBX01350
          C9 = CF*CF/C2                                                   DBX01360
          IF(C6-50.)130,150,150                                           DBX01370
      130 A4=1./EXP(C6)                                                   DBX01380
      150 IF(C7-50.)160,180,180                                           DBX01390
      160 A5=1./EXP(C7)                                                   DBX01400
      180 IF(C8-50.)190,210,210                                           DBX01410
      190 A6=1./EXP(C8)                                                   DBX01420
      210 IF(C9-50.)220,240,240                                           DBX01430
      220 A7=1./EXP(C9)                                                   DBX01440
      240 T=A4+A5+A6+A7                                                   DBX01450
          SUM=SUM+T                                                       DBX01460
          IF (T-0.01)250,120,120                                          DBX01470
      250 RC=A1*(A2+A3+SUM)                                               DBX01480
          M = 5                                                           DBX01490
          RETURN                                                          DBX01500
C             CALCULATE MULTIPLE EDDY REFLECTIONS FOR GROUND LEVEL RECEPTOR HDBX01510
      340 A1 = 1./(6.28318*U*SY*SZ*C1)                                    DBX01520
          A2 = 0.                                                         DBX01530
          C2 = 2.*SZ*SZ                                                   DBX01540
          C3 = H*H/C2                                                     DBX01550
          IF(C3-50.)360,410,410                                           DBX01560
      360 A2 = 2./EXP(C3)                                                 DBX01570
      410 SUM = 0.                                                        DBX01580
          THL = 2. * HL                                                   DBX01590
      420 AN = AN + 1.                                                    DBX01600
```

```
      A4 = 0.                                                    DBX01610
      A6 = 0.                                                    DBX01620
      C5 = AN*THL                                                DBX01630
      CC = H-C5                                                  DBX01640
      CE = H + C5                                                DBX01650
      C6 = CC*CC/C2                                              DBX01660
      C8 = CE*CE/C2                                              DBX01670
      IF(C6-50.)430,480,480                                      DBX01680
  430 A4 = 2./EXP(C6)                                            DBX01690
  480 IF(C8-50.)490,540,540                                      DBX01700
  490 A6 = 2./EXP(C8)                                            DBX01710
  540 T = A4 + A6                                                DBX01720
      SUM = SUM + T                                              DBX01730
      IF(T-0.01)550,420,420                                      DBX01740
  550 RC = A1 * (A2 + SUM)                                       DBX01750
      M = 4                                                      DBX01760
      RETURN                                                     DBX01770
      END                                                        DBX01780
```

```
      SUBROUTINE DBTSIG (X,XY,KST,SY,SZ)                                    DBS00010
      DIMENSION XA(7),XB(2),XD(5),XE(8),XF(9),AA(8),BA(8),AB(3),BB(3),      DBS00020
     1 AD(6),BD(6),AE(9),BE(9),AF(10),BF(10)                                DBS00030
      DATA XA/.5,.4,.3,.25,.2,.15,.1/                                       DBS00040
      DATA XB/.4,.2/                                                        DBS00050
      DATA XD /30.,10.,3.,1.,.3/                                            DBS00060
      DATA XE /40.,20.,10.,4.,2.,1.,.3,.1/                                  DBS00070
      DATA XF /60.,30.,15.,7.,3.,2.,1.,.7,.2/                               DBS00080
      DATA BA /2.1166,1.7283,1.4094,1.2644,1.1262,1.0932,1.0542,.9447/      DBS00090
      DATA AA /453.85,346.75,258.89,217.41,179.52,170.22,158.08,122.8/      DBS00100
      DATA BB /1.0971,0.98332,0.93198/                                      DBS00110
      DATA AD /44.053,36.650,33.504,32.093,32.093,34.459/                   DBS00120
      DATA BD /0.51179,0.56589,0.60486,0.64403,0.81066,0.86974/             DBS00130
      DATA AE /47.618,35.420,26.970,24.703,22.534,21.628,21.628,23.331,     DBS00140
     1 24.26/                                                               DBS00150
      DATA BE /0.29592,0.37615,0.46713,0.50527,0.57154,0.63077,0.75660,     DBS00160
     1 0.81956,0.8366/                                                      DBS00170
      DATA AF /34.219,27.074,22.651,17.836,16.187,14.823,13.953,13.953,     DBS00180
     1 14.457,15.209/                                                       DBS00190
      DATA BF /0.21716,0.27436,0.32681,0.41507,0.46490,0.54503,0.62227,     DBS00200
     1 0.68465,0.78407,0.81558/                                             DBS00210
      GO TO (10,20,30,40,50,60),KST                                         DBS00220
C        STABILITY A (10)                                                   DBS00230
   10 TH = (24.167 - 2.5334*ALOG(XY))/57.2958                               DBS00240
      IF (X.GT.3.11) GO TO 69                                               DBS00250
      DO 11 ID = 1,7                                                        DBS00260
      IF(X.GE.XA(ID)) GO TO 12                                              DBS00270
   11 CONTINUE                                                              DBS00280
      ID = 8                                                                DBS00290
   12 SZ = AA(ID) * X ** BA(ID)                                             DBS00300
      GO TO 71                                                              DBS00310
C        STABILITY B (20)                                                   DBS00320
   20 TH = (18.333 - 1.8096*ALOG(XY))/57.2958                               DBS00330
      IF(X.GT.35.) GO TO 69                                                 DBS00340
      DO 21 ID = 1,2                                                        DBS00350
      IF (X.GE.XB(ID)) GO TO 22                                             DBS00360
   21 CONTINUE                                                              DBS00370
      ID = 3                                                                DBS00380
   22 SZ = AB(ID) * X ** BB(ID)                                             DBS00390
                                                                            DBS00400
```

```
      GO TO 70                                                          DBS00410
C        STABILITY C (70)                                               DBS00420
   30 TH = (12.5 - 1.0857*ALOG(XY))/57.2958                             DBS00430
      SZ = 61.141 *X ** 0.91465                                         DBS00440
      GO TO 70                                                          DBS00450
C        STABILITY D (40)                                               DBS00460
   40 TH = (8.3333-0.72382*ALOG(XY))/57.2958                            DBS00470
      DO 41 ID = 1,5                                                    DBS00480
      IF (X.GE.XD(ID)) GO TO 42                                         DBS00490
   41 CONTINUE                                                          DBS00500
      ID = 6                                                            DBS00510
   42 SZ = AD(ID) * X ** BD(ID)                                         DBS00520
      GO TO 70                                                          DBS00530
C        STABILITY E (50)                                               DBS00540
   50 TH = (6.25 - 0.54287*ALOG(XY))/57.2958                            DBS00550
      DO 51 ID = 1,8                                                    DBS00560
      IF (X.GE.XE(ID)) GO TO 52                                         DBS00570
   51 CONTINUE                                                          DBS00580
      ID = 9                                                            DBS00590
   52 SZ = AE(ID) * X ** BE(ID)                                         DBS00600
      GO TO 70                                                          DBS00610
C        STABILITY F (60)                                               DBS00620
   60 TH = (4.1667 - 0.36191*ALOG(XY))/57.2958                          DBS00630
      DO 61 ID = 1,9                                                    DBS00640
      IF (X.GE.XF(ID)) GO TO 62                                         DBS00650
   61 CONTINUE                                                          DBS00660
      ID = 10                                                           DBS00670
   62 SZ = AF(ID) * X ** BF(ID)                                         DBS00680
      GO TO 70                                                          DBS00690
   69 SZ = 5000.                                                        DBS00700
      GO TO 71                                                          DBS00710
   70 IF (SZ.GT.5000.) SZ = 5000.                                       DBS00720
   71 SY = 1000. * XY * SIN(TH)/(2.15 * COS(TH))                        DBS00730
      RETURN                                                            DBS00740
      END                                                               DBS00750
```

```
      FUNCTION XVY(SYO,KST)                                          XVY00010
      GO TO (1,2,3,4,5,6),KST                                        XVY00020
    1 XVY=(SYO/213.0)**1.1148                                        XVY00030
      RETURN                                                         XVY00040
    2 XVY=(SYO/155.0)**1.097                                         XVY00050
      RETURN                                                         XVY00060
    3 XVY=(SYO/103.0)**1.092                                         XVY00070
      RETURN                                                         XVY00080
    4 XVY=(SYO/68.0)**1.076                                          XVY00090
      RETURN                                                         XVY00100
    5 XVY=(SYO/50.0)**1.086                                          XVY00110
      RETURN                                                         XVY00120
    6 XVY=(SYO/33.5)**1.083                                          XVY00130
      RETURN                                                         XVY00140
      END                                                            XVY00150
```

```
      FUNCTION XVZ(SZO,KST)                                                  XVZ00010
      DIMENSION SA(7),SB(2),SD(5),SE(9),SF(9),AA(8),AB(3),AD(6),AE(9),       XVZ00020
     1AF(10),CA(8),CB(3),CD(6),CE(9),CF(10)                                  XVZ00030
      DATA SA/13.95,21.40,29.3,37.67,47.44,71.16,104.65/                     XVZ00040
      DATA SB/20.23,40.0/                                                    XVZ00050
      DATA SD/12.09,32.09,65.12,134.9,251.2/                                 XVZ00060
      DATA SE/3.534,8.698,21.628,33.489,49.767,79.07,109.3,141.86/           XVZ00070
      DATA SF/4.093,10.93,13.953,21.627,26.976,40.,54.89,68.84,83.25/        XVZ00080
      DATA AA/122.8,158.08,170.22,179.52,217.41,258.89,346.75,453.85/        XVZ00090
      DATA AB/90.673,98.483,109.3/                                           XVZ00100
      DATA AD/34.459,32.093,32.093,33.504,36.650,44.053/                     XVZ00110
      DATA AE/24.26,23.331,21.628,21.628,22.534,24.703,26.97,35.42,          XVZ00120
     *47.618/                                                                XVZ00130
      DATA AF/15.209,14.457,13.953,13.953,14.823,16.187,17.836,22.651,       XVZ00140
     *27.074,34.219/                                                         XVZ00150
      DATA CA/1.0585,0.9486,0.9147,0.8879,0.7909,0.7095,0.5786,0.4725/       XVZ00160
      DATA CB/1.073,1.017,0.9115/                                            XVZ00170
      DATA CD/1.1498,1.2336,1.5527,1.6533,1.7671,1.9539/                     XVZ00180
      DATA CE/1.1953,1.2202,1.3217,1.5854,1.7497,1.9791,2.1407,2.6585,       XVZ00190
     *3.3793/                                                                XVZ00200
      DATA CF/1.2261,1.2754,1.4606,1.5816,1.8348,2.151,2.4092,3.0599,        XVZ00210
     *3.6443,4.6049/                                                         XVZ00220
      GO TO (10,20,30,40,50,60),KST                                          XVZ00230
C        STABILITY A (10)                                                    XVZ00240
   10 DO 11 ID=1,7                                                           XVZ00250
      IF(SZO.LE.SA(ID)) GO TO 12                                             XVZ00260
   11 CONTINUE                                                               XVZ00270
      ID=8                                                                   XVZ00280
   12 XVZ=(SZO/AA(ID))**CA(ID)                                               XVZ00290
      RETURN                                                                 XVZ00300
C        STABILITY B (20)                                                    XVZ00310
   20 DO 21 ID=1,2                                                           XVZ00320
      IF(SZO.LE.SB(ID)) GO TO 22                                             XVZ00330
   21 CONTINUE                                                               XVZ00340
      ID=3                                                                   XVZ00350
   22 XVZ=(SZO/AB(ID))**CB(ID)                                               XVZ00360
      RETURN                                                                 XVZ00370
C        STABILITY C (30)                                                    XVZ00380
   30 XVZ=(SZO/61.141)**1.0933                                               XVZ00390
      RETURN                                                                 XVZ00400
```

```
C         STABILITY D (40)                                          XVZ00410
   40 DO 41 ID=1,5                                                  XVZ00420
      IF(SZO.LE.SD(ID)) GO TO 42                                    XVZ00430
   41 CONTINUE                                                      XVZ00440
      ID=6                                                          XVZ00450
   42 XVZ=(SZO/AD(ID))**CD(ID)                                      XVZ00460
      RETURN                                                        XVZ00470
C         STABILITY E (50)                                          XVZ00480
   50 DO 51 ID=1,6                                                  XVZ00490
      IF(SZO.LE.SE(ID)) GO TO 52                                    XVZ00500
   51 CONTINUE                                                      XVZ00510
      ID=9                                                          XVZ00520
   52 XVZ=(SZO/AE(ID))**CE(ID)                                      XVZ00530
      RETURN                                                        XVZ00540
C         STABILITY F (60)                                          XVZ00550
   60 DO 61 ID=1,9                                                  XVZ00560
      IF(SZO.LE.SF(ID)) GO TO 62                                    XVZ00570
   61 CONTINUE                                                      XVZ00580
      ID=10                                                         XVZ00590
   62 XVZ=(SZO/AF(ID))**CF(ID)                                      XVZ00600
      RETURN                                                        XVZ00610
      END                                                           XVZ00620
```

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      BLOCK DATA                                                          BL100010
      COMMON/COEFMM/BAD1,BAD2,BAD3,BAD4                                   BL100020
      COMMON/DET/DETER                                                    BL100030
      REAL DETER(20),BAD1(12,5),BAD2(12,5),BAD3(12,5),BAD4(12,5)          BL100040
      DATA BAD1/                                                          BL100050
     &  0.10210419E+01,-0.46106476E-01, 0.12750413E-01, 0.19804664E-01,   BL100060
     &  0.10487151E-02,-0.15174127E+00, 0.19398060E-01,-0.79918522E-04,   BL100070
     & -0.27256622E-03, 0.33066291E+00,-0.24132896E-02, 0.32060244E-03,   BL100080
     &  0.63576120E+00,-0.24510358E-01, 0.43812852E-01, 0.49628541E-02,   BL100090
     &  0.44958130E-03,-0.47973134E-01, 0.61538182E-02, 0.10994070E-04,   BL100100
     & -0.67511966E-04, 0.30338836E+00,-0.27355787E-02, 0.13473761E-03,   BL100110
     &  0.28043038E+00,-0.47583590E-02, 0.43524541E-01, 0.13808063E-02,   BL100120
     &  0.10754808E-03,-0.21531656E-02, 0.93090301E-03, 0.11250070E-04,   BL100130
     & -0.19257031E-05, 0.22921783E+00,-0.40214434E-02, 0.12248126E-03,   BL100140
     &  0.49613750E+00,-0.14627926E-01, 0.61504323E-01,-0.10729437E-02,   BL100150
     &  0.21254545E-03,-0.68023652E-02, 0.97647379E-03, 0.10525828E-03,   BL100160
     &  0.37405029E-04, 0.26291054E+00,-0.18189936E-02, 0.84008745E-04,   BL100170
     &  0.50066710E+00,-0.17586595E-01, 0.59339337E-01,-0.18133272E-02,   BL100180
     &  0.22920808E-03,-0.12368958E-01, 0.11492474E-02, 0.74215845E-04,   BL100190
     &  0.14108437E-04, 0.30531263E+00,-0.70244968E-02, 0.10785337E-03/   BL100200
      DATA BAD2/                                                          BL100210
     &  0.39664203E+00,-0.13213880E-01, 0.58552373E-01,-0.19716325E-02,   BL100220
     &  0.16135792E-03,-0.43251687E-02, 0.21358313E-03, 0.86380664E-04,   BL100230
     &  0.40023762E-04, 0.24617422E+00,-0.68550445E-02, 0.10254829E-03,   BL100240
     &  0.36676234E+00,-0.14121491E-01, 0.68226576E-01,-0.32857144E-02,   BL100250
     &  0.18291990E-03, 0.22933292E-02, 0.19526284E-04, 0.13627447E-03,   BL100260
     &  0.54617223E-04, 0.22517568E+00,-0.46133995E-02, 0.69841262E-04,   BL100270
     &  0.10577946E+01,-0.67509690E-01, 0.62050894E-01, 0.11177700E-01,   BL100280
     &  0.14054242E-02,-0.17354453E+00, 0.21822363E-01, 0.12219173E-03,   BL100290
     & -0.29136962E-03, 0.30515999E+00,-0.65815225E-02, 0.36294828E-03,   BL100300
     &  0.68093568E+00,-0.48967101E-01, 0.90703070E-01, 0.41544996E-02,   BL100310
     &  0.97224675E-03,-0.92593906E-01, 0.13378501E-01, 0.19100340E-03,   BL100320
     & -0.13010977E-03, 0.19975567E+00,-0.77630468E-02, 0.33748685E-03,   BL100330
     &  0.10887880E+01,-0.71653783E-01, 0.56213565E-01, 0.12077432E-01,   BL100340
     &  0.14173663E-02,-0.18283314E+00, 0.22780791E-01, 0.11450195E-03,   BL100350
     & -0.30368124E-03, 0.31737489E+00,-0.97049810E-02, 0.31322357E-03/   BL100360
      DATA BAD3/                                                          BL100370
     &  0.12207556E+01,-0.89525678E-01, 0.95823228E-01, 0.61595142E-02,   BL100380
     &  0.17752303E-02,-0.19405907E+00, 0.24501167E-01, 0.30660117E-03,   BL100390
     & -0.31120144E-03, 0.30530828E+00,-0.67905560E-02, 0.22574072E-03,   BL100400
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     &  0.14931040E+01,-0.10349673E+00, 0.72227307E-02, 0.59160888E-02, BL100410
     &  0.20053601E-02,-0.23721021E+00, 0.26225589E-01, 0.23920002E-04, BL100420
     & -0.39849989E-03, 0.32876998E+00,-0.91728717E-02, 0.29819994E-03, BL100430
     &  0.11040087E+01,-0.79453886E-01, 0.56303188E-01, 0.17077201E-02, BL100440
     &  0.16181599E-02,-0.17064410E+00, 0.19803409E-01, 0.20100000E-03, BL100450
     & -0.26381994E-03, 0.25955880E+00,-0.75969696E-02, 0.26727002E-03, BL100460
     &  0.28853571E+00,-0.12315691E-01, 0.92407882E-01,-0.31504999E-02, BL100470
     &  0.16614000E-03, 0.70702210E-02, 0.46436000E-03, 0.14813000E-03, BL100480
     &  0.56589997E-04, 0.15976292E+00,-0.65233000E-02, 0.10359001E-03, BL100490
     &  0.20974290E+00,-0.12848910E-01, 0.96859634E-01,-0.66359304E-02, BL100500
     &  0.18598999E-03, 0.21924630E-01,-0.15685901E-02, 0.27883006E-03, BL100510
     &  0.12293000E-03, 0.11387944E+00,-0.28685799E-02, 0.47189998E-04/ BL100520
      DATA BAD4/                                                       BL100530
     &  0.57665521E+00,-0.36277410E-01, 0.21571960E-01, 0.29442401E-02, BL100540
     &  0.63650007E-03,-0.52853432E-01, 0.69414489E-02,-0.17560000E-04, BL100550
     & -0.94470000E-04, 0.25530094E+00,-0.76948516E-02, 0.13530999E-03, BL100560
     &  0.54005557E+00,-0.39594091E-01, 0.28321180E-01, 0.14426301E-02, BL100570
     &  0.70013991E-03,-0.57096951E-01, 0.73297806E-02, 0.53550000E-04, BL100580
     & -0.85880005E-04, 0.20601881E+00,-0.58017895E-02, 0.85580003E-04, BL100590
     &  0.21578521E+00,-0.12577798E-01, 0.51477298E-01,-0.23425999E-02, BL100600
     &  0.16780000E-03,-0.15755999E-02, 0.28229994E-03, 0.12529999E-03, BL100610
     &  0.48500006E-04, 0.11655778E+00,-0.46298988E-02, 0.69899994E-04, BL100620
     &  0.21578521E+00,-0.12577798E-01, 0.51477298E-01,-0.23425999E-02, BL100630
     &  0.16780000E-03,-0.15755999E-02, 0.28229994E-03, 0.12529999E-03, BL100640
     &  0.48500006E-04, 0.11655778E+00,-0.46298988E-02, 0.69899994E-04, BL100650
     &  0.21578521E+00,-0.12577798E-01, 0.51477298E-01,-0.23425999E-02, BL100660
     &  0.16780000E-03,-0.15755999E-02, 0.28229994E-03, 0.12529999E-03, BL100670
     & 0.48500006E-04, 0.11655778E+00,-0.46298988E-02, 0.69899994E-04/  BL100680
      DATA DETER/.146,.214,.558,.671,.708,.824,1.033,.312,.290,.327,    BL100690
     & .351,.218,.217,.497,.524,.558,.584,.339,.144,-0.037/              BL100700
      END                                                               BL100710
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      BLOCK DATA                                                        BL200010
C                                                                       BL200020
      COMMON/ACOM/AIN1,AIN2,AIN3                                        BL200030
C                                                                       BL200040
      REAL AIN1(6,18),AIN2(6,18),AIN3(6,18)                             BL200050
C                                                                       BL200060
C**HC SPEED CORRECTION FACTOR COEFFICIENTS                              BL200070
      DATA AIN1/                                                        BL200080
     *2.2461,-.29097,0.015889,-.47249E-03,0.69408E-05,-.39280E-07,      BL200090
     *2.3103,-.28957,0.015299,-.44669E-03,0.64818E-05,-.36346E-07,      BL200100
     *2.1656,-.26999,0.014420,-.43364E-03,0.65074E-05,-.37810E-07,      BL200110
     *2.3973,-.29998,0.016135,-.48749E-03,0.72909E-05,-.41977E-07,      BL200120
     *2.4087,-.30819,0.016817,-.50684E-03,0.75385E-05,-.43160E-07,      BL200130
     *2.2322,-.25499,0.015383,-.45674E-03,0.67349E-05,-.38380E-07,      BL200140
     *2.2522,-.28778,0.015682,-.47318E-03,0.70795E-05,-.40846E-07,      BL200150
     *2.0278,-.27305,0.015360,-.46030E-03,0.67853E-05,-.38468E-07,      BL200160
     *2.1506,-.28362,0.015380,-.44214E-03,0.62873E-05,-.34631E-07,      BL200170
     *2.2302,-.29365,0.016240,-.48415E-03,0.71159E-05,-.40286E-07,      BL200180
     *2.1223,-.29107,0.016910,-.52615E-03,0.80271E-05,-.47012E-07,      BL200190
     *2.1536,-.28345,0.015700,-.46976E-03,0.69383E-05,-.39471E-07,      BL200200
     *2.0735,-.28935,0.017300,-.55471E-03,0.86420E-05,-.51311E-07,      BL200210
     *2.3495,-.30496,0.016842,-.50962E-03,0.75952E-05,-.43496E-07,      BL200220
     *2.1134,-.28568,0.016320,-.50079E-03,0.75507E-05,-.43719E-07,      BL200230
     *2.1194,-.29863,0.018450,-.61654E-03,0.99206E-05,-.60402E-07,      BL200240
     *2.6838,-.34463,0.019542,-.62572E-03,0.97844E-05,-.58337E-07,      BL200250
     *2.3954,-.33578,0.021161,-.73155E-03,0.12072E-04,-.74857E-07/      BL200260
C                                                                       BL200270
C**CO SPEED CORRECTION FACTOR COEFFICIENTS                              BL200280
      DATA AIN2/                                                        BL200290
     *  1.8198,-.25466,.015235,-.48740E-03,.75821E-05,-.44951E-07,      BL200300
     *  2.3399,-.29698,.016007,-.47740E-03,.70675E-05,-.40398E-07,      BL200310
     *  2.4415,-.29147,.014296,-.38785E-03,.52978E-05,-.28244E-07,      BL200320
     *  2.4655,-.30502,.016050,-.47397E-03,.69908E-05,-.39976E-07,      BL200330
     *  2.7780,-.31913,.015318,-.42233E-03,.58495E-05,-.31497E-07,      BL200340
     *  2.7890,-.32711,.016294,-.46757E-03,.67191E-05,-.37440E-07,      BL200350
     *  2.7074,-.33131,.017618,-.53858E-03,.81740E-05,-.47780E-07,      BL200360
     *  1.8692,-.27668,.017233,-.55628E-03,.87168E-05,-.51698E-07,      BL200370
     *  1.8213,-.27205,.017030,-.55202E-03,.86254E-05,-.51144E-07,      BL200380
     *  2.0142,-.29519,.018635,-.62161E-03,.99366E-05,-.59978E-07,      BL200390
     *  2.0453,-.31062,.020485,-.70853E-03,.11621E-04,-.71569E-07,      BL200400
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     *  2.3187,-.34115,.020945,-.66589E-03,.10223E-04,-.59827E-07,    BL200410
     *  2.5752,-.32889,.018975,-.62826E-03,.10092E-04,-.61273E-07,    BL200420
     *  2.6845,-.33282,.017628,-.52412E-03,.77222E-05,-.43702E-07,    BL200430
     *  2.1549,-.32912,.021011,-.68906E-03,.10839E-04,-.64712E-07,    BL200440
     *  2.5456,-.36285,.023277,-.81504E-03,.13623E-04,-.85591E-07,    BL200450
     *  2.8393,-.36876,.021078,-.67644E-03,.10627E-04,-.63641E-07,    BL200460
     *  2.4875,-.39156,.027072,-.97618E-03,.16527E-04,-1.0432E-07/    BL200470
C                                                                     BL200480
C**NOX SPEED CORRECTION FACTOR COEFFICIENTS                           BL200490
      DATA AIN3/                                                      BL200500
     *  2.4442,-.250110,1.3829E-02,-.28703E-03,.2075EE-05,0.0,        BL200510
     *  1.6863,-.118300,.65497E-02,-.13714E-03,.10085E-05,0.0,        BL200520
     *  1.1265,-.039340,.26864E-02,-.60802E-04,.47729E-06,0.0,        BL200530
     *  1.2268,-.044498,.26248E-02,-.56715E-04,.43429E-06,0.0,        BL200540
     *  1.0174,-.011896,.91437E-03,-.21574E-04,.18230E-06,0.0,        BL200550
     *  .98760,-.019567,.16964E-02,-.40400E-04,.32900E-06,0.0,        BL200560
     *  1.1592,-.044454,.29643E-02,-.66899E-04,.52236E-06,0.0,        BL200570
     *  1.8866,-.161290,.90499E-02,-.18561E-03,.13256E-05,0.0,        BL200580
     *  1.5578,-.113030,.67183E-02,-.14341E-03,.10608E-05,0.0,        BL200590
     *  2.0452,-.194010,.11074E-01,-.23175E-03,.16837E-05,0.0,        BL200600
     *  1.6326,-.121860,.70302E-02,-.14629E-03,.10614E-05,0.0,        BL200610
     *  1.4482,-.122440,.79502E-02,-.17108E-03,.12578E-05,0.0,        BL200620
     *  .24597,.084195,-.34084E-02,.62988E-04,-.41397E-06,0.0,        BL200630
     *  1.2817,-.080487,.53574E-02,-.11889E-03,.90106E-06,0.0,        BL200640
     *  1.5345,-.125670,.78592E-02,-.16943E-03,.12549E-05,0.0,        BL200650
     *  .70481,.038153,-.17391E-02,.32614E-04,-.20385E-06,0.0,        BL200660
     *  .78384,.32855E-03,.10603E-02,-.31935E-04,.29039E-06,0.0,      BL200670
     *  .94213,-.042324,.38625E-02,-.93985E-04,.75389E-06,0.0  /      BL200680
C                                                                     BL200690
      END                                                             BL200700
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      BLOCK DATA                                                        BL300010
C                                                                       BL300020
      COMMON/MYMCOM/MYM,MYR,TF                                          BL300030
      COMMON/LNKCOM/SPD,TEMP,PCCO,PCHS,PCCC,MS                          BL300040
C                                                                       BL300050
      REAL SPD(3),MS(6),MYM(20,6),MYR(20,6),TF(20,6)                    BL300060
C                                                                       BL300070
C**DEFAULT MODAL SPLIT                                                  BL300080
      DATA MS/.803,.058,.058,.045,.031,.005/                            BL300090
C                                                                       BL300100
C**ANNUAL AVERAGE MILEAGE ACCUMULATION (DIVIDED BY 100000)              BL300110
      DATA MYM/                                                         BL300120
     *0.159,0.150,0.140,0.131,0.122,0.113,0.103,0.094,0.085,0.076,      BL300130
     *0.067,0.066,0.062,0.059,0.055,0.051,0.050,0.047,0.044,0.044,      BL300140
     *0.159,0.150,0.140,0.131,0.122,0.113,0.103,0.094,0.085,0.076,      BL300150
     *0.067,0.066,0.062,0.059,0.055,0.051,0.050,0.047,0.044,0.044,      BL300160
     *0.157,0.157,0.141,0.126,0.113,0.102,0.094,0.086,0.080,0.075,      BL300170
     *0.071,0.066,0.063,0.060,0.055,0.052,0.050,0.047,0.044,0.041,      BL300180
     *0.190,0.190,0.179,0.165,0.150,0.135,0.120,0.106,0.095,0.086,      BL300190
     *0.078,0.070,0.063,0.059,0.053,0.049,0.047,0.046,0.044,0.042,      BL300200
     *0.736,0.736,0.699,0.633,0.566,0.500,0.456,0.412,0.382,0.360,      BL300210
     *0.346,0.338,0.331,0.324,0.309,0.287,0.257,0.213,0.184,0.154,      BL300220
     *.0201,.0251,.0207,.0185,.0172,.0162,.0155,.0149,.0143,.0139,      BL300230
     *.0135,.0132,.0129,.0127,.0125,.0123,.0122,.0121,.0120,.0119/      BL300240
C                                                                       BL300250
C**VEHICLE REGISTRATION DISTRIBUTIONS                                   BL300260
      DATA MYR/                                                         BL300270
     *0.075,0.107,0.107,0.106,0.100,0.092,0.085,0.077,0.066,0.052,      BL300280
     *0.039,0.027,0.018,0.014,0.009,0.006,0.005,0.005,0.005,0.004,      BL300290
     *0.061,0.095,0.094,0.103,0.083,0.076,0.076,0.063,0.054,0.043,      BL300300
     *0.036,0.024,0.030,0.028,0.026,0.024,0.022,0.020,0.018,0.016,      BL300310
     *0.037,0.070,0.078,0.086,0.075,0.075,0.075,0.068,0.059,0.053,      BL300320
     *0.044,0.032,0.038,0.036,0.034,0.032,0.030,0.028,0.026,0.024,      BL300330
     *0.037,0.070,0.078,0.086,0.075,0.075,0.075,0.068,0.059,0.053,      BL300340
     *0.044,0.032,0.038,0.036,0.034,0.032,0.030,0.028,0.026,0.024,      BL300350
     *0.077,0.135,0.134,0.131,0.099,0.090,0.082,0.062,0.045,0.033,      BL300360
     *0.025,0.015,0.013,0.011,0.010,0.008,0.007,0.006,0.005,0.004,      BL300370
     *0.105,0.225,0.206,0.149,0.097,0.062,0.046,0.033,0.029,0.023,      BL300380
     *0.008,0.005,0.013,0.0  ,0.0  ,0.0  ,0.0  ,0.0  ,0.0  ,0.0  /      BL300390
C                                                                       BL300400
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      END
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BL300410

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      BLOCK DATA                                                          BL400010
C                                                                         BL400020
      COMMON/INDXCM/INDX49,INDXCA,INDXHI                                  BL400030
      COMMON/BASECM/BASE49,BASECA,BASEHI                                  BL400040
      COMMON/DELCOM/ DEL49, DELCA, DELHI                                  BL400050
C                                                                         BL400060
      INTEGER INDX49(30,3,6),INDXCA(30,3,6),INDXHI(30,3,6)                BL400070
      REAL BASE49(10,3,6),BASECA(10,3,6),BASEHI(10,3,6)                   BL400080
      REAL DEL49 (10,3,6),DELCA (10,3,6),DELHI (10,3,6)                   BL400090
C                                                                         BL400100
C     6 6 6 6 7 7 7 7 7 7 7 7 7 7 8 8 8 8 8 8 8 8 8 9 9 9 9 9 9           BL400110
C     6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5         BL400120
      DATA INDX49/                                                        BL400130
     *1,1,2,2,2,2,2,2,2,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4, BL400140
     *1,1,2,2,2,2,2,2,2,3,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5, BL400150
     *1,1,2,2,2,2,2,2,3,3,4,4,5,5,5,5,6,6,6,6,6,6,6,6,6,6,6,6,6,6,6,6,6, BL400160
     *1,1,2,2,2,2,2,2,2,2,3,3,3,3,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5, BL400170
     *1,1,2,2,2,2,2,2,2,2,3,3,3,3,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5, BL400180
     *1,1,2,2,2,2,2,2,3,3,3,4,4,4,4,5,5,5,5,5,5,5,6,6,6,6,6,6,6,6,6,6,6, BL400190
     *1,1,1,1,2,2,2,2,2,2,2,2,2,2,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4, BL400200
     *1,1,1,1,2,2,2,2,2,2,2,2,2,2,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4, BL400210
     *1,1,1,1,2,2,2,2,2,2,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4, BL400220
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5, BL400230
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5, BL400240
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,5,5,5, BL400250
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4, BL400260
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4, BL400270
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4, BL400280
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4, BL400290
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4, BL400300
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4 / BL400310
C                                                                         BL400320
C     6 6 6 6 7 7 7 7 7 7 7 7 7 7 8 8 8 8 8 8 8 8 8 9 9 9 9 9 9           BL400330
C     6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5         BL400340
      DATA INDXCA/                                                        BL400350
     *2,2,2,2,2,2,2,2,2,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4, BL400360
     *2,2,2,2,2,2,2,2,2,3,3,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5, BL400370
     *2,2,2,2,2,2,2,2,3,3,4,4,5,5,5,6,7,7,7,7,7,7,7,7,7,7,7,7,7,7,7,7,7, BL400380
     *1,1,2,2,2,2,2,2,2,2,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5, BL400390
     *1,1,2,2,2,2,2,2,2,2,3,3,3,4,5,5,6,6,6,6,6,6,6,6,6,6,6,6,6,6,6,6,6, BL400400
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     *1,1,2,2,2,2,2,3,3,4,4,4,4,5,5,6,6,7,7,7,7,7,7,7,7,7,7,7,7,7,  BL400410
     *1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,  BL400420
     *1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,  BL400430
     *1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,  BL400440
     *1,1,1,2,2,2,2,2,3,3,4,4,5,5,5,6,6,6,7,7,7,7,7,7,7,7,7,7,7,7,  BL400450
     *1,1,1,2,2,2,2,2,3,3,4,4,5,5,5,5,5,5,6,6,6,6,6,6,6,6,6,6,6,6,  BL400460
     *1,1,1,2,2,2,2,2,3,3,4,4,5,5,5,6,6,6,6,6,7,7,7,7,7,7,7,7,7,7,  BL400470
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,  BL400480
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,  BL400490
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,  BL400500
     *1,1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,  BL400510
     *1,1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,  BL400520
C                                                                   BL400530
C      6 6 6 6 7 7 7 7 7 7 7 7 7 7 8 8 8 8 8 8 8 8 8 9 9 9 9 9 9    BL400540
C      6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5  BL400550
      DATA INDXHI/                                                  BL400560
     *1,1,2,2,2,2,2,2,2,3,3,4,5,5,6,7,7,7,8,8,8,8,8,8,8,8,8,8,8,8,  BL400570
     *1,1,2,2,2,2,2,2,2,3,3,4,5,5,6,7,7,7,8,8,8,8,8,8,8,8,8,8,8,8,  BL400580
     *1,1,2,2,2,2,2,2,3,3,4,4,5,6,6,7,8,8,8,9,9,9,9,9,9,9,9,9,9,9,  BL400590
     *1,1,2,2,2,2,2,2,2,2,3,3,4,5,6,6,6,6,7,8,8,8,8,8,8,8,8,8,8,8,  BL400600
     *1,1,2,2,2,2,2,2,2,2,3,3,4,5,6,6,6,6,7,8,8,8,8,8,8,8,8,8,8,8,  BL400610
     *1,1,2,2,2,2,2,2,3,3,4,4,5,6,7,7,7,7,7,8,9,9,9,9,9,9,9,9,9,9,  BL400620
     *1,1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,  BL400630
     *1,1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,  BL400640
     *1,1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,  BL400650
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,5,6,6,6,6,6,6,6,6,6,6,5,5,  BL400660
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,5,6,6,6,6,6,6,6,6,6,6,6,6,  BL400670
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,5,6,6,6,6,6,6,6,6,6,6,6,6,  BL400680
     *1,1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,4,5,5,5,5,5,5,5,5,6,6,6,  BL400690
     *1,1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,  BL400700
     *1,1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,3,4,4,4,4,4,4,4,5,5,5,5,  BL400710
     *1,1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,  BL400720
     *1,1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,  BL400730
     *1,1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,  BL400740
C                                                                   BL400750
C***EXHAUST EMISSION FACTOR INTERCEPT: 49 STATE                     BL400760
      DATA BASE49/                                                  BL400770
     *  4.45,  2.43,  1.13,  0.13,  0.13,  0.0 ,  0.0 ,  0.0 ,  0.0 ,BL400780
     *  6E.30, 31.14, 18.60,  3.00,  1.40,  1.40,  0.0 ,  0.0 ,  0.0 ,  0.0 ,BL400790
     *  0.0 ,  0.0 ,  0.0 ,  0.0 ,  0.0 ,  0.0 ,  0.0 ,  0.0 ,  0.0 ,  0.0 ,BL400800
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     *  3.58,  4.43,  2.98,  2.42,  1.50,  0.29, 0.0 , 0.0 , 0.0 , 0.0 ,BL400810
     *  4.45,  2.43,  1.11,  0.94,  0.31,  0.31, 0.0 , 0.0 , 0.0 , 0.0 ,BL400820
     * 68.30, 31.14, 16.10, 14.50,  3.87,  3.87, 0.0 , 0.0 , 0.0 , 0.0 ,BL400830
     *  3.58,  4.43,  2.98,  2.45,  1.73,  0.41, 0.0 , 0.0 , 0.0 , 0.0 ,BL400840
     *  5.99,  2.90,  0.94,  0.31,  0.31,  0.31, 0.0 , 0.0 , 0.0 , 0.0 ,BL400850
     * 78.70, 32.40, 14.50,  3.87,  3.87,  3.87, 0.0 , 0.0 , 0.0 , 0.0 ,BL400860
     *  6.49,  5.04,  1.73,  0.41,  0.41,  0.41, 0.0 , 0.0 , 0.0 , 0.0 ,BL400870
     * 23.90, 18.54, 22.02,  5.22,  1.46,  1.46, 0.0 , 0.0 , 0.0 , 0.0 ,BL400880
     *272.90,212.70,218.80,191.90, 15.38, 15.38, 0.0 , 0.0 , 0.0 , 0.0 ,BL400890
     *  8.80, 12.80, 10.50,  9.10,  3.99,  3.99, 0.0 , 0.0 , 0.0 , 0.0 ,BL400900
     *  4.30,  4.50,  4.50,  2.85,  2.85,  2.85, 0.0 , 0.0 , 0.0 , 0.0 ,BL400910
     * 35.10, 27.00, 27.00, 27.00, 27.00, 27.00, 0.0 , 0.0 , 0.0 , 0.0 ,BL400920
     * 21.40, 20.10, 19.90,  5.35,  5.35,  5.35, 0.0 , 0.0 , 0.0 , 0.0 ,BL400930
     *  8.96,  4.70,  3.82,  0.29,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL400940
     * 34.40, 20.27, 14.96,  2.71,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL400950
     *  0.14,  0.28,  0.56,  0.04,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 /BL400960
C                                                                        BL400970
C***EXHAUST EMISSION FACTOR INTERCEPT: CALIFORNIA                        BL400980
      DATA BASECA/                                                       BL400990
     *  4.45,  2.00,  0.29,  0.15,  0.15,  0.15, 0.0 , 0.0 , 0.0 , 0.0 ,BL401000
     * 68.30, 30.42,  3.80,  3.80,  3.00,  3.00, 0.0 , 0.0 , 0.0 , 0.0 ,BL401010
     *  3.58,  3.92,  3.12,  1.50,  1.10,  0.29, 0.21, 0.0 , 0.0 , 0.0 ,BL401020
     *  4.45,  2.43,  1.11,  0.29,  0.15,  0.15, 0.15, 0.0 , 0.0 , 0.0 ,BL401030
     * 68.30, 31.14, 16.10, 13.70,  3.80,  3.80, 3.80, 0.0 , 0.0 , 0.0 ,BL401040
     *  3.58,  4.43,  2.98,  1.50,  1.28,  0.54, 0.21, 0.0 , 0.0 , 0.0 ,BL401050
     *  5.99,  2.90,  0.29,  0.16,  0.16,  0.16, 0.16, 0.0 , 0.0 , 0.0 ,BL401060
     * 78.70, 32.40, 13.70,  3.80,  3.80,  3.80, 3.80, 0.0 , 0.0 , 0.0 ,BL401070
     *  6.49,  5.04,  1.73,  0.44,  0.44,  0.44, 0.44, 0.0 , 0.0 , 0.0 ,BL401080
     * 23.90, 18.54, 22.02, 18.16,  5.22,  3.50, 1.46, 0.0 , 0.0 , 0.0 ,BL401090
     *272.90,212.70,218.80,209.00,191.90, 15.38,15.38, 0.0 , 0.0 , 0.0 ,BL401100
     *  8.80, 12.80, 10.50,  7.50,  8.04,  6.20, 3.99, 0.0 , 0.0 , 0.0 ,BL401110
     *  4.30,  4.50,  4.50,  2.85,  2.85,  2.85, 2.85, 0.0 , 0.0 , 0.0 ,BL401120
     * 35.10, 27.00, 27.00, 27.00, 27.00, 27.00,27.00, 0.0 , 0.0 , 0.0 ,BL401130
     * 21.40, 20.10, 18.61, 16.30,  5.35,  5.35, 5.35, 0.0 , 0.0 , 0.0 ,BL401140
     *  8.96,  4.70,  3.82,  0.82,  0.29,  0.29, 0.29, 0.29, 0.29,BL401150
     * 34.40, 20.27, 14.86,  2.71,  2.71,  2.71, 2.71, 2.71, 2.71,BL401160
     *  0.14,  0.28,  0.56,  0.04,  0.04,  0.04, 0.04, 0.04, 0.04/BL401170
C                                                                        BL401180
C***EXHAUST EMISSION FACTOR INTERCEPT: HIGH ALTITUDE                     BL401190
      DATA BASEHI/                                                       BL401200
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     *  6.03,  4.07,  1.83,  0.70,  1.83,  0.21, 0.21, 0.13, 0.13, 0.13,BL401210
     *110.04, 76.73, 38.31, 10.30, 38.31,  6.18, 2.88, 1.40, 1.40, 1.40,BL401220
     *  1.96,  3.00,  1.94,  1.50,  1.90,  1.50, 0.93, 0.18, 0.29, 0.29,BL401230
     *  6.03,  4.07,  1.79,  1.11,  1.79,  1.52, 0.47, 0.31, 0.0 , 0.0 ,BL401240
     *110.04, 76.73, 33.15, 16.10, 33.15, 29.90, 8.00, 3.87, 0.0 , 0.0 ,BL401250
     *  1.96,  3.00,  1.94,  1.52,  2.45,  1.52, 1.07, 1.73, 0.41, 0.0 ,BL401260
     *  8.12,  4.86,  1.52,  0.47,  0.31,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL401270
     *127.30, 79.90, 29.90,  8.00,  3.87,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL401280
     *  3.55,  3.41,  1.07,  1.73,  0.41,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL401290
     *  32.40, 31.05, 36.77,  8.74,  2.35,  1.46, 0.0 , 0.0 , 0.0 , 0.0 ,BL401300
     *441.50,344.20,353.20,310.90, 31.70, 15.38, 0.0 , 0.0 , 0.0 , 0.0 ,BL401310
     *  4.82,  8.67,  6.84,  5.92,  5.64,  3.99, 0.0 , 0.0 , 0.0 , 0.0 ,BL401320
     *  5.80,  6.10,  6.10,  3.85,  2.85,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL401330
     *  56.80, 43.70, 43.70, 43.70, 27.00,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL401340
     *  11.80, 13.10, 12.90,  5.35,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL401350
     *  12.10,  7.97,  6.38,  0.45,  0.29,  0.29, 0.29, 0.29, 0.29, 0.29,BL401360
     *  47.10, 27.80, 20.40,  5.58,  2.71,  2.71, 2.71, 2.71, 2.71, 2.71,BL401370
     *   0.08,  0.18,  0.36,  0.03,  0.04,  0.04, 0.04, 0.04, 0.04,  0.0/BL401380
                                                                        BL401390
C                                                                       BL401400
C***EXHAUST EMISSION FACTOR SLOPE: 49 STATE                             BL401410
      DATA DEL49/                                                       BL401420
     * 0.58, 0.53, 0.23, 0.23, 0.23, 0.23, 0.0 , 0.0 , 0.0 , 0.0 ,     BL401430
     * 3.06, 6.15, 2.80, 2.30, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 ,     BL401440
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.16, 0.22, 0.0 , 0.0 , 0.0 , 0.0 ,     BL401450
     * 0.58, 0.53, 0.41, 0.41, 0.23, 0.23, 0.0 , 0.0 , 0.0 , 0.0 ,     BL401460
     * 3.06, 6.15, 5.34, 5.34, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 ,     BL401470
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.11, 0.22, 0.0 , 0.0 , 0.0 , 0.0 ,     BL401480
     * 0.58, 0.53, 0.41, 0.23, 0.23, 0.23, 0.0 , 0.0 , 0.0 , 0.0 ,     BL401490
     * 3.06, 6.15, 5.34, 2.00, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 ,     BL401500
     * 0.0 , 0.0 , 0.11, 0.22, 0.22, 0.22, 0.0 , 0.0 , 0.0 , 0.0 ,     BL401510
     * 0.58, 0.53, 0.53, 0.53, 1.06, 1.06, 0.0 , 0.0 , 0.0 , 0.0 ,     BL401520
     * 3.06, 6.15, 6.15, 6.15,10.54,10.54, 0.0 , 0.0 , 0.0 , 0.0 ,     BL401530
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.34, 0.34, 0.0 , 0.0 , 0.0 , 0.0 ,     BL401540
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,     BL401550
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,     BL401560
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,     BL401570
     * 1.17, 1.03, 1.03, 0.23, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,     BL401580
     * 1.54, 4.00, 4.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0   /   BL401590
     * 0.0 , 0.0 , 0.0 , 0.22, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0       BL401600
C
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C***EXHAUST EMISSION FACTOR SLOPE: CALIFORNIA                          BL401610
      DATA DELCA/                                                      BL401620
     * 0.58, 0.70, 0.23, 0.23, 0.23, 0.23, 0.0 , 0.0 , 0.0 , 0.0 ,    BL401630
     * 3.06, 6.40, 2.33, 2.33, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 ,    BL401640
     * 0.0 , 0.0 , 0.0 , 0.16, 0.16, 0.22, 0.22, 0.0 , 0.0 , 0.0 ,    BL401650
     * 0.58, 0.53, 0.41, 0.23, 0.23, 0.23, 0.23, 0.0 , 0.0 , 0.0 ,    BL401660
     * 3.06, 6.15, 5.34, 5.34, 2.33, 2.00, 2.00, 0.0 , 0.0 , 0.0 ,    BL401670
     * 0.0 , 0.0 , 0.0 , 0.11, 0.22, 0.22, 0.22, 0.0 , 0.0 , 0.0 ,    BL401680
     * 0.58, 0.53, 0.23, 0.23, 0.23, 0.23, 0.23, 0.0 , 0.0 , 0.0 ,    BL401690
     * 3.06, 6.15, 5.34, 2.00, 2.00, 2.00, 2.00, 0.0 , 0.0 , 0.0 ,    BL401700
     * 0.0 , 0.0 , 0.11, 0.22, 0.22, 0.22, 0.22, 0.0 , 0.0 , 0.0 ,    BL401710
     * 0.58, 0.53, 0.53, 0.53, 0.53, 0.53, 1.06, 0.0 , 0.0 , 0.0 ,    BL401720
     * 3.06, 6.15, 6.15, 6.15, 6.15,10.54,10.54, 0.0 , 0.0 , 0.0 ,    BL401730
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.34, 0.0 , 0.0 , 0.0 ,    BL401740
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,    BL401750
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,    BL401760
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,    BL401770
     * 0.58, 0.53, 0.53, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23,    BL401780
     * 3.06, 6.15, 6.15, 2.00, 2.00, 2.00, 2.00, 2.00, 2.00, 2.00,    BL401790
     * 0.0 , 0.0 , 0.0 , 0.22, 0.22, 0.22, 0.22, 0.22, 0.22, 0.22 /   BL401800
C                                                                      BL401810
C***EXHAUST EMISSION FACTOR SLOPE: HIGH ALTITUDE                       BL401820
      DATA DELHI/                                                      BL401830
     * 0.55, 0.55, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23,    BL401840
     * 2.81, 4.24, 2.80, 2.80, 2.80, 2.30, 2.00, 2.00, 2.00, 2.00,    BL401850
     * 0.0 , 0.0 , 0.0 , 0.0°, 0.16, 0.16, 0.16, 0.22, 0.22, 0.22,    BL401860
     * 0.55, 0.55, 0.41, 0.41, 0.41, 0.41, 0.23, 0.23, 0.0 , 0.0 ,    BL401870
     * 2.81, 4.24, 5.34, 5.34, 5.34, 5.34, 2.00, 2.00, 0.0 , 0.0 ,    BL401880
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.11, 0.11, 0.22, 0.0 ,    BL401890
     * 0.55, 0.55, 0.41, 0.23, 0.23, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,    BL401900
     * 2.81, 4.24, 5.34, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,    BL401910
     * 0.0 , 0.0 , 0.11, 0.11, 0.22, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,    BL401920
     * 0.55, 0.55, 0.55, 0.55, 1.06, 1.06, 0.0 , 0.0 , 0.0 , 0.0 ,    BL401930
     * 2.81, 4.24, 4.24, 4.24,10.54,10.54, 0.0 , 0.0 , 0.0 , 0.0 ,    BL401940
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.34, 0.0 , 0.0 , 0.0 , 0.0 ,    BL401950
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,    BL401960
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,    BL401970
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,    BL401980
     * 0.55, 0.55, 0.55, 0.23, 0.23, 0.23, 0.23  0.23, 0.23, 0.23,    BL401990
     * 2.81, 4.24, 4.24, 2.00, 2.00, 2.00, 2.00  2.00, 2.00, 2.00,    BL402000
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     * 0.0 , 0.0 , 0.0 , 0.22, 0.22, 0.22, 0.22, 0.22, 0.22, 0.22 /      BL402010
C                                                                         BL402020
      END                                                                 BL402030
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      BLOCK DATA                                                        BL500010
C                                                                       BL500020
      COMMON/IDLBCM/IDLB49,IDLBCA,IDLBHI                                BL500030
      COMMON/IDLDCM/IDEL49,IDELCA,IDELHI                                BL500040
C                                                                       BL500050
      REAL IDLB49(10,3,6),IDLBCA(10,3,6),IDLBHI(10,3,6)                 BL500060
      REAL IDEL49(10,3,6),IDELCA(10,3,6),IDELHI(10,3,6)                 BL500070
C                                                                       BL500080
C***IDLE EMISSION FACTOR INTERCEPT: 49 STATE                            BL500090
      DATA IDLB49/                                                      BL500100
     * 2.01, 0.68, 0.27, 0.03, 0.07, 0.07, 0.0 , 0.0 , 0.0 , 0.0 ,BL500110
     * 16.42, 12.73, 5.43, 0.88, 0.41, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500120
     * 0.16, 0.26, 0.16, 0.36, 0.22, 0.04, 0.2 , 0.0 , 0.0 , 0.0 ,BL500130
     * 2.01, 0.68, 0.28, 0.24, 0.08, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500140
     * 16.42, 12.73, 2.02, 1.62, 0.49, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500150
     * 0.16, 0.26, 0.16, 0.25, 0.18, 0.04, 0.0 , 0.0 , 0.0 , 0.0 ,BL500160
     * 2.93, 1.86, 0.24, 0.08, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500170
     * 17.24, 18.62, 1.82, 0.49, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500180
     * 0.18, 0.27, 0.18, 0.04, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500190
     * 3.85, 0.71, 3.09, 0.73, 0.20, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500200
     * 24.63, 15.70, 21.92, 19.23, 1.54, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500210
     * 0.02, 0.04, 0.02, 0.02, 0.01, 0.01, 0.0 , 0.0 , 0.0 , 0.0 ,BL500220
     * 0.50, 0.40, 0.40, 0.25, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500230
     * 1.32, 0.66, 0.66, 0.66, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500240
     * 1.11, 1.00, 0.99, 0.27, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500250
     * 4.05, 2.12, 1.72, 0.13, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500260
     * 8.27, 4.87, 3.57, 0.65, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500270
     * 0.01, 0.02, 0.04, 0.01, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 /BL500280
C                                                                       BL500290
C***IDLE EMISSION FACTOR INTERCEPT: CALIFORNIA                          BL500300
      DATA IDLBCA/                                                      BL500310
     * 2.01, 0.93, 0.04, 0.02, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500320
     * 16.42, 15.02, 0.18, 0.18, 0.14, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500330
     * 0.16, 0.24, 0.07, 0.11, 0.08, 0.02, 0.02, 0.0 , 0.0 , 0.0 ,BL500340
     * 2.01, 0.68, 0.23, 0.07, 0.04, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500350
     * 16.42, 12.73, 2.02, 1.72, 0.48, 0.48, 0.0 , 0.0 , 0.0 , 0.0 ,BL500360
     * 0.16, 0.26, 0.16, 0.25, 0.21, 0.09, 0.04, 0.0 , 0.0 , 0.0 ,BL500370
     * 2.93, 1.86, 0.07, 0.04, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500380
     * 17.24, 18.62, 1.72, 0.48, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500390
     * 0.18, 0.27, 0.25, 0.09, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500400
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     *  3.85,  0.71,  3.09,  0.18,  0.05,  0.03, 0.01, 0.0 , 0.0 , 0.0 ,BL500410
     * 24.63, 15.70, 21.92,  4.40,  4.04,  0.32, 0.0 , 0.0 , 0.0 , 0.0 ,BL500420
     *  0.02,  0.04,  0.02,  0.05,  0.05,  0.04, 0.03, 0.0 , 0.0 , 0.0 ,BL500430
     *  0.50,  0.40,  0.40,  0.25,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500440
     *  1.32,  0.66,  0.66,  0.66,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500450
     *  1.11,  1.00,  0.93,  0.81,  0.27,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500460
     *  3.46,  1.81,  1.48,  0.32,  0.11,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500470
     * 11.57,  6.82,  5.00,  0.91,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500480
     *  0.01,  0.02,  0.04,  0.01,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 /BL500490
C                                                                        BL500500
C***IDLE EMISSION FACTOR INTERCEPT: HIGH ALTITUDE                        BL500510
      DATA IDLEHI/                                                       BL500520
     *  2.29,  1.04,  0.24,  0.17,  0.24,  0.05, 0.05, 0.03, 0.0 , 0.0 ,BL500530
     * 20.70, 20.71,  4.48,  3.01,  4.48,  1.81, 0.84, 0.41, 0.0 , 0.0 ,BL500540
     *  0.26,  0.19,  0.08,  0.06,  0.28,  0.06, 0.14, 0.02, 0.04, 0.0 ,BL500550
     *  2.29,  1.04,  0.22,  0.28,  0.22,  0.39, 0.12, 0.08, 0.0 , 0.0 ,BL500560
     * 20.70, 20.71,  5.60,  2.02,  5.60,  3.75, 1.01, 0.49, 0.0,  0.0, BL500570
     *  0.26,  0.19,  0.08,  0.04,  0.25,  0.04, 0.11, 0.18, 0.04, 0.0 ,BL500580
     *  3.40,  3.50,  0.39,  0.12,  0.08,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500590
     * 38.84, 48.25,  3.75,  1.01,  0.49,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500600
     *  0.10,  0.17,  0.11,  0.18,  0.04,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500610
     *  4.46,  1.34,  5.82,  1.22,  0.32,  0.20, 0.0 , 0.0 , 0.0 , 0.0 ,BL500620
     * 55.59, 40.68, 56.80, 31.15,  3.17,  1.54, 0.0 , 0.0 , 0.0 , 0.0 ,BL500630
     *  0.01,  0.03,  0.02,  0.01,  0.01,  0.01, 0.0 , 0.0 , 0.0 , 0.0 ,BL500640
     *  0.58,  0.75,  0.75,  0.34,  0.25,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500650
     *  2.97,  1.71,  1.71,  1.71,  0.66,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500660
     *  0.64,  0.64,  0.64,  0.27,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500670
     *  4.01,  3.59,  2.87,  0.20,  0.13,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500680
     * 26.07,  6.68,  4.90,  1.34,  0.65,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500690
     *  0.01,  0.01,  0.03,  0.01,  0.04,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 /BL500700
C                                                                        BL500710
C***IDLE EMISSION FACTOR SLOPE: 49 STATE                                 BL500720
      DATA IDEL49/                                                       BL500730
     * 0.18, 0.20, 0.07, 0.07, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,      BL500740
     * 2.55, 2.92, 0.83, 0.67, 0.59, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,      BL500750
     * 0.0 , 0.0 , 0.0 , 0.03, 0.06, 0.08, 0.0 , 0.0 , 0.0 , 0.0 ,      BL500760
     * 0.18, 0.20, 0.19, 0.19, 0.06, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,      BL500770
     * 2.55, 2.92, 1.56, 1.56, 0.25, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,      BL500780
     * 0.0 , 0.0 , 0.0 , 0.02, 0.01, 0.02, 0.0 , 0.0 , 0.0 , 0.0 ,      BL500790
     * 0.18, 0.20, 0.19, 0.06, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,      BL500800
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     * 2.55, 2.92, 1.56, 0.25, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL500810
     * 0.0 , 0.0 , 0.01, 0.02, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL500820
     * 0.18, 0.20, 0.20, 0.20, 0.40, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL500830
     * 2.55, 2.92, 2.92, 2.92, 5.00, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL500840
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL500850
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL500860
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL500870
     * 0.36, 0.62, 0.62, 0.10, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL500880
     * 1.28, 1.12, 1.12, 0.48, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL500890
     * 0.0 , 0.0 , 0.0 , 0.01, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 /   BL500900
C                                                                     BL500910
C***IDLE EMISSION FACTOR SLOPE: CALIFORNIA                            BL500920
      DATA IDELCA/                                                    BL500930
     * 0.18, 0.31, 0.01, 0.01, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL500940
     * 2.55, 3.15, 0.08, 0.08, 0.06, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL500950
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL500960
     * 0.18, 0.20, 0.19, 0.05, 0.05, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL500970
     * 2.55, 2.92, 1.56, 1.56, 0.29, 0.29, 0.0 , 0.0 , 0.0 , 0.0 ,   BL500980
     * 0.0 , 0.0 , 0.0 , 0.02, 0.04, 0.04, 0.04, 0.0 , 0.0 , 0.0 ,   BL500990
     * 0.18, 0.20, 0.05, 0.05, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL501000
     * 2.55, 2.92, 1.56, 0.29, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL501010
     * 0.0 , 0.0 , 0.02, 0.04, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL501020
     * 0.18, 0.20, 0.20, 0.20, 0.20, 0.20, 0.40, 0.0 , 0.0 , 0.0 ,   BL501030
     * 2.55, 2.92, 2.92, 2.92, 2.92, 5.00, 0.0 , 0.0 , 0.0 , 0.0 ,   BL501040
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL501050
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL501060
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL501070
     * 0.31, 0.28, 0.28, 0.12, 0.12, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL501080
     * 1.80, 3.61, 3.61, 1.13, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL501090
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 /   BL501100
C                                                                     BL501110
C***IDLE EMISSION FACTOR SLOPE: HIGH ALTITUDE                         BL501120
      DATA IDELHI/                                                    BL501130
     * 0.21, 0.14, 0.02, 0.07, 0.07, 0.07, 0.07, 0.07, 0.0 , 0.0 ,   BL501140
     * 0.53, 1.15, 0.98, 0.83, 0.83, 0.67, 0.59, 0.59, 0.0 , 0.0 ,   BL501150
     * 0.0 , 0.0 , 0.0 , 0.04, 0.06, 0.06, 0.06, 0.08, 0.08, 0.0 ,   BL501160
     * 0.21, 0.14, 0.08, 0.19, 0.19, 0.19, 0.06, 0.06, 0.0 , 0.0 ,   BL501170
     * 0.53, 1.15, 1.24, 1.56, 1.56, 1.56, 0.25, 0.25, 0.0 , 0.0 /   BL501180
                                                                      BL501190
                                                                      BL501200
```

```
     * 0.0 , 0.0 , 0.0 , 0.03, 0.02, 0.02, 0.01, 0.01, 0.02, 0.0 ,   BL501210
     * 0.21, 0.14, 0.19, 0.06, 0.06, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL501220
     * 0.53, 1.15, 1.56, 0.25, 0.25, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL501230
     * 0.0 , 0.0 , 0.01, 0.01, 0.02, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL501240
     * 0.21, 0.14, 0.14, 0.20, 0.40, 0.40, 0.0 , 0.0 , 0.0 , 0.0 ,   BL501250
     * 0.53, 1.15, 1.15, 2.92, 5.00, 5.00, 0.0 , 0.0 , 0.0 , 0.0 ,   BL501260
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL501270
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL501280
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL501290
     * 0.36, 0.62, 0.62, 0.10, 0.10, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL501300
     * 0.66, 1.12, 1.12, 0.48, 0.48, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,   BL501310
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.01, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 /   BL501320
C                                                                     BL501330
      END                                                             BL501340
                                                                      BL501350
```

```
      BLOCK DATA                                                          BL600010
C                                                                         BL600020
      COMMON/IMCRED/PCIMHN,PCIMHY,PCIMCN,PCIMCY                           BL600030
C                                                                         BL600040
      INTEGER PCIMHN(19,5,4),PCIMHY(19,5,4),PCIMCN(19,5,4),               BL600050
     *  PCIMCY(19,5,4)                                                   BL600060
C                                                                         BL600070
C                                                                         BL600080
      DATA PCIMHN/ 3. 6,11.15,19.24,27,31,35,39,41,42,44,46,47,48,49,51,BL600090
     * 52.    4. 8,13,18,22,28,34,36,40,42,45,46,49,50,51,52,54,56,57.   BL600100
     *        7,14,20,28,34,39,43,46,49,52,54,55,57,58,59,60,61,62,63.   BL600110
     *        8,15,22,30,36,41,46,49,52,54,56,58,59,61,62,63,64,65,65.   BL600120
     *        8,16,23,31,37,42,46,50,53,55,57,59,60,61,62,63,64,65,66.   BL600130
     *        4. 6. 9,11,16,19,20,23,25,28,29,30,32,33,35,36,36,37,38.   BL600140
     *        6,11,16,20,23,27,31,33,36,38,40,41,43,44,45,46,47,48,49.   BL600150
     *       10,18,24,28,33,36,40,42,45,47,48,50,51,53,55,55,55,57,58.   BL600160
     *       12,20,26,32,37,40,43,46,49,51,52,54,55,56,57,59,59,60,61.   BL600170
     *       13,22,28,34,39,43,46,49,51,54,55,57,58,59,61,61,62,63,64.   BL600180
     *        4,11,22,32,42,49,54,58,62,64,66,68,69,71,72,73,74,74,75.   BL600190
     *        4,13,25,37,46,53,58,62,65,67,69,71,72,73,74,75,76,77,77.   BL600200
     *        4,15,28,40,49,55,60,64,67,69,71,72,74,75,76,77,77,78,79.   BL600210
     *        5,17,31,43,51,59,63,66,69,71,73,74,75,76,77,78,79,79,80.   BL600220
     *        5,18,32,44,53,59,63,67,70,72,73,75,76,77,78,79,79,80,81.   BL600230
     *        3. 7,14,27,31,38,44,49,53,56,58,60,62,63,65,66,67,68,69.   BL600240
     *        3. 7,15,24,33,40,46,51,54,57,60,62,63,65,66,67,68,69,70.   BL600250
     *        3. 7,16,25,34,41,47,51,55,58,60,62,64,65,67,68,69,70,71.   BL600260
     *        3. 8,17,26,35,42,48,52,56,59,61,63,65,66,68,69,70,71,71.   BL600270
C       3. 8,17,27,36,43,49,54,57,60,62,64,66,67,68,69,70,71,72/          BL600280
      DATA PCIMHY/ 6,13,17,20,25,32,35,40,45,47,49,50,53,53,54,56,57,57,BL600290
     * 58.    9,14,19,25,31,36,43,45,50,51,53,54,55,56,58,58,61,63,63.   BL600300
     *       12,19,27,35,41,44,51,53,55,57,59,61,61,63,65,65,66,66,67.   BL600310
     *       13,24,33,40,46,50,54,57,59,61,63,65,65,66,68,68,69,70,71.   BL600320
     *       14,25,35,42,48,53,56,59,62,64,65,66,68,69,70,70,71,72,72.   BL600330
     *        9,13,15,18,22,26,28,31,33,35,37,39,40,42,44,44,44,46,48.   BL600340
     *       13,16,20,26,31,34,38,41,43,44,45,47,48,50,52,52,53,54,55.   BL600350
     *       14,21,28,33,38,41,45,47,50,52,53,54,56,57,59,60,61,61,62.   BL600360
     *       15,24,31,36,41,44,46,50,52,54,56,58,58,60,61,62,63,63,65.   BL600370
     *       16,26,33,39,43,47,50,53,55,57,59,60,61,63,64,65,65,66,67.   BL600380
     *       10,33,51,59,67,70,74,76,78,80,80,81,82,83,84,84,85,85,86.   BL600400
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     *      13.36.53.62.69.73.76.78.80.81.82.83.83.84.85.85.86.86.87.    BL600410
     *      15.38.54.64.70.74.77.79.81.82.83.84.85.85.86.86.87.87.87.    BL600420
     *      16.39.54.64.70.74.77.80.81.83.84.85.85.86.87.87.87.88.88.    BL600430
     *      16.39.54.64.70.74.77.80.81.83.84.85.86.86.87.87.88.88.88.    BL600440
     *       7.24.36.52.54.65.66.69.72.75.75.75.77.79.79.80.80.81.81.    BL600450
     *      11.29.45.56.63.68.70.74.76.76.78.80.80.81.82.82.83.84.84.    BL600460
     *      12.32.46.58.65.69.72.75.76.77.80.81.81.82.83.83.84.85.85.    BL600470
     *      14.36.52.62.68.73.76.78.80.81.82.83.84.85.85.86.86.87.87.    BL600480
     *      15.38.54.64.70.74.77.79.81.83.84.85.85.86.87.87.88.88.88/    BL600490
C                                                                         BL600500
C                                                                         BL600510
      DATA PCIMCN/ 7.13.17.22.26.30.32.35.37.40.41.42.44.45.46.47.48.50.BL600520
     * 50.   9.17.22.27.31.35.37.40.42.44.46.48.49.51.52.53.54.55.56.    BL600530
     *      12.21.27.32.36.40.44.47.49.52.53.55.56.58.59.60.61.62.62.    BL600540
     *      14.23.29.35.39.43.47.50.52.55.56.58.59.60.61.62.63.64.65.    BL600550
     *      15.25.31.36.41.45.49.52.54.56.58.59.61.62.63.64.65.65.66.    BL600560
     *      10.15.20.23.26.28.31.32.34.35.37.37.38.40.41.41.42.43.44.    BL600570
     *      17.25.29.32.36.38.41.42.44.46.47.48.49.50.51.52.52.53.54.    BL600580
     *      21.31.36.40.44.47.49.51.53.55.56.57.58.59.60.61.62.62.63.    BL600590
     *      23.34.39.43.46.49.52.54.56.57.59.60.61.62.63.63.64.65.65.    BL600600
     *      25.36.41.45.49.52.54.56.58.60.61.62.63.64.65.66.67.67.68.    BL600610
     *       0. 4. 8.14.20.26.30.33.35.39.42.44.45.48.49.50.50.53.55.    BL600620
     *       0. 5.10.18.23.28.32.37.40.43.45.47.49.51.52.53.54.56.57.    BL600630
     *       1. 6.13.21.27.33.38.42.45.48.50.52.54.56.57.59.60.61.62.    BL600640
     *       1. 6.14.22.28.34.39.43.47.49.52.54.55.57.58.60.61.62.63.    BL600650
     *       2. 7.14.22.29.35.40.44.47.50.52.54.56.58.59.60.61.62.63.    BL600660
     *       0. 2. 7.13.19.24.29.33.37.40.43.45.47.49.50.52.53.54.55.    BL600670
     *       0. 4.11.19.26.32.37.42.45.48.51.53.55.56.58.59.60.62.62.    BL600680
     *       1. 5.13.21.28.34.40.44.48.51.53.55.57.58.60.61.62.63.64.    BL600690
     *       2. 8.18.28.36.42.47.52.55.58.60.62.63.65.66.67.68.69.70.    BL600700
     *       3.12.23.33.42.48.53.57.60.63.65.66.68.69.70.71.72.73.74/    BL600710
C                                                                         BL600720
      DATA PCIMCY/11.20.26.30.34.40.43.47.50.52.53.55.58.57.58.59.61.60.BL600730
     *  62.  16.23.29.35.40.43.49.51.54.55.57.58.59.60.62.62.64.66.66.    BL600740
     *      20.29.37.42.47.49.55.57.59.61.62.64.64.66.67.68.68.68.70.    BL600750
     *      22.34.41.46.51.55.58.61.63.64.65.67.68.69.70.70.71.72.73.    BL600760
     *      23.35.42.48.53.57.60.62.65.66.68.69.70.71.72.72.73.74.74.    BL600770
     *      17.25.27.31.35.38.40.43.44.45.49.50.50.53.54.54.55.56.58.    BL600780
     *      26.33.36.41.46.48.51.54.56.57.58.59.60.61.63.63.64.65.66.    BL600790
     *      30.41.47.50.54.57.59.61.63.65.65.66.67.68.69.70.71.71.71.    BL600800
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     *      32,45,50,54,57,60,63,64,65,67,68,69,70,71,72,72,73,73,74,   BL600810
     *      33,47,52,56,60,62,65,67,68,69,70,71,72,73,74,74,75,75,76,   BL600820
     *       5,24,40,48,56,60,65,67,69,72,72,74,75,76,77,78,78,79,79,   BL600830
     *       8,27,42,51,58,63,66,69,71,73,74,76,76,77,78,79,79,80,80,   BL600840
     *      11,29,43,52,59,64,67,70,72,74,75,76,77,78,79,80,80,81,81,   BL600850
     *      13,30,43,52,59,64,68,71,73,75,76,77,78,79,80,80,81,82,82,   BL600860
     *      14,30,43,52,59,64,68,71,73,75,76,77,78,79,80,81,81,82,82,   BL600870
     *       9,30,41,56,58,68,68,71,74,77,77,78,79,81,81,81,81,82,83,   BL600880
     *      15,37,51,60,66,70,72,76,77,78,80,82,82,82,83,84,84,85,85,   BL600890
     *      18,39,52,62,68,71,74,77,78,79,82,82,82,84,84,84,85,86,86,   BL600900
     *      21,43,57,66,71,75,78,80,81,83,84,85,85,86,86,87,87,88,88,   BL600910
     *      23,44,58,66,72,76,79,81,83,84,85,86,86,87,88,88,88,89,89/   BL600920
C                                                                       BL600930
      END                                                               BL600940
C           DATA SET PTHWY      AT LEVEL 019 AS OF 08/24/77            BL600950
```
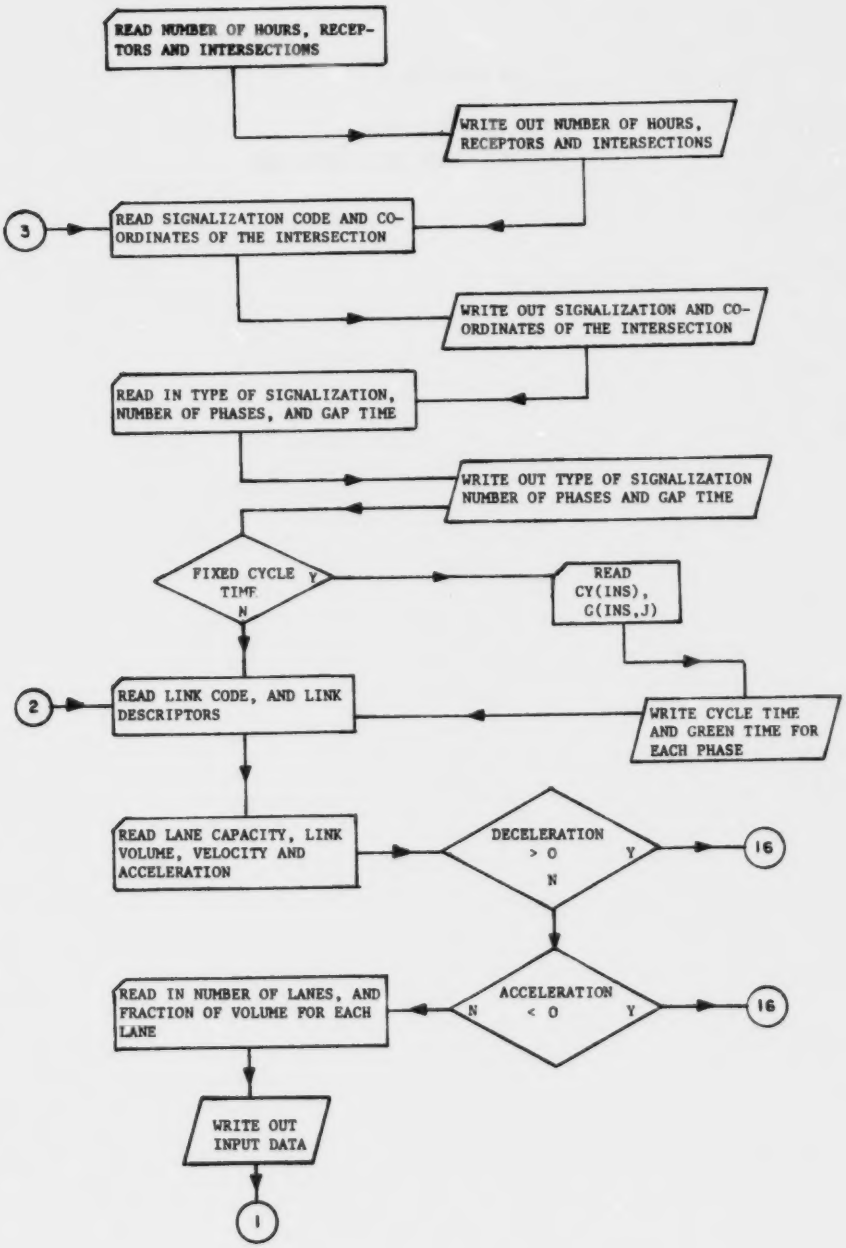
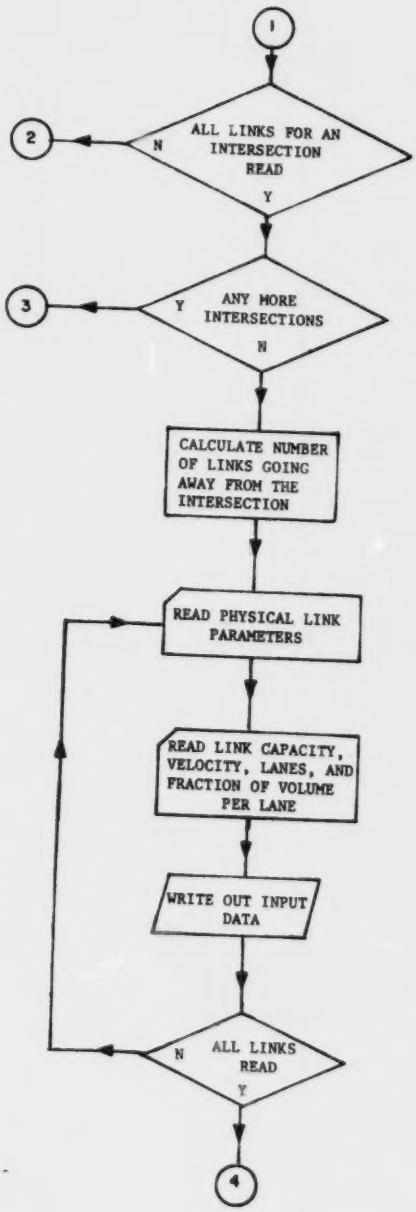
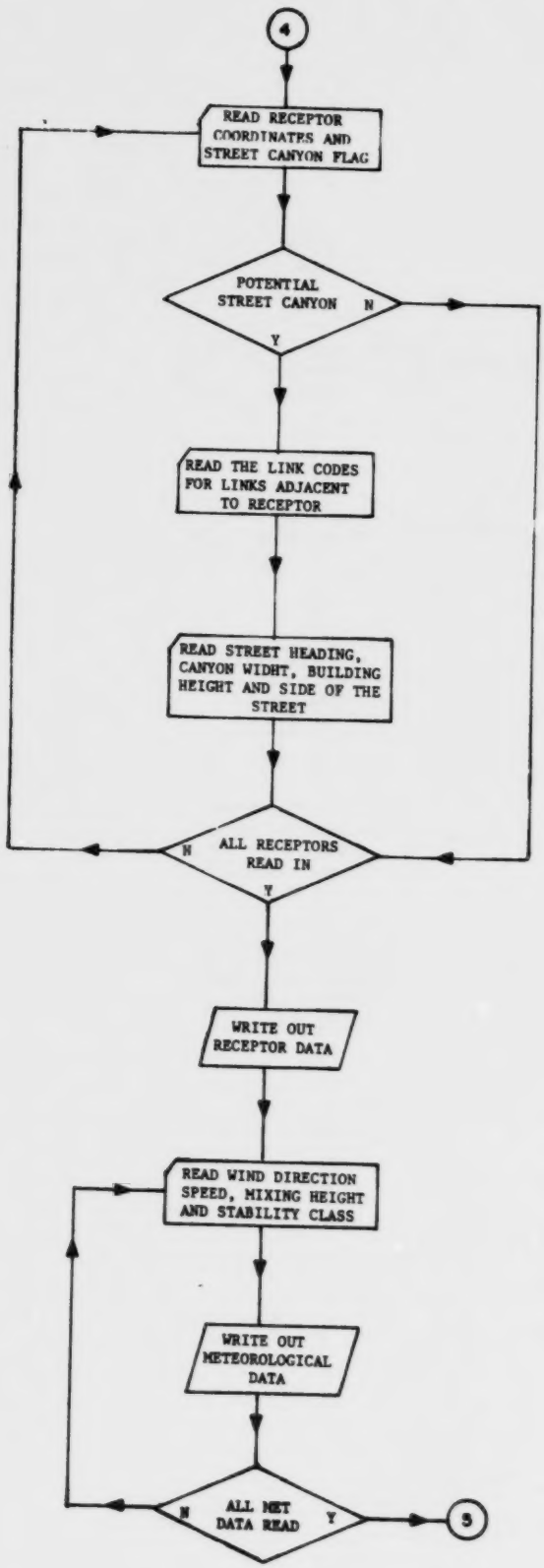
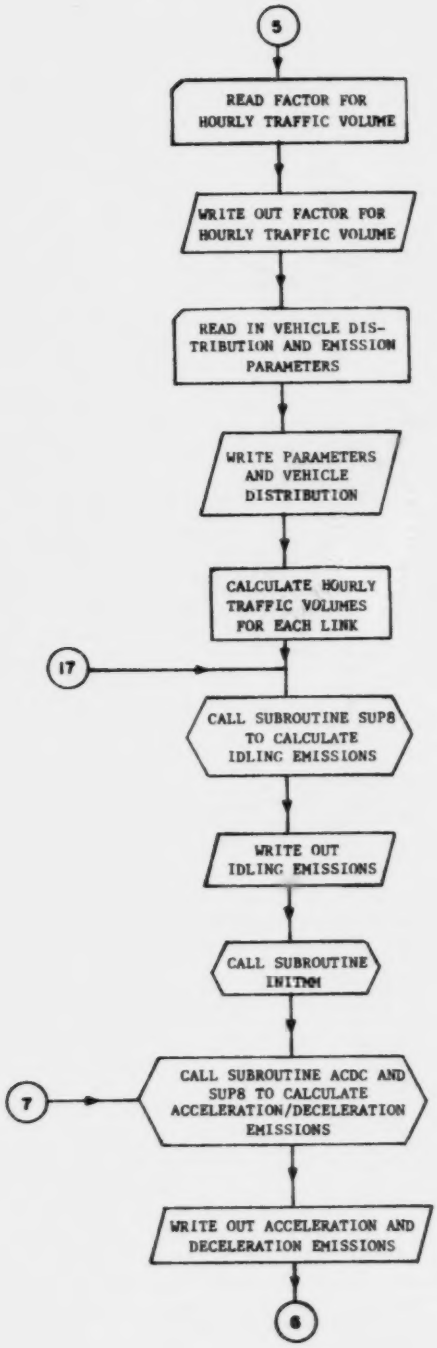

APPENDIX B

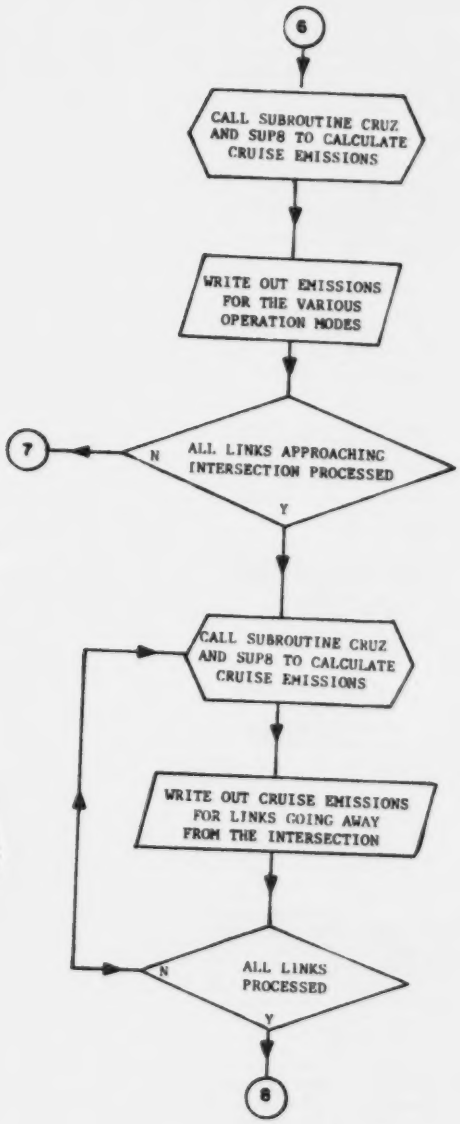
FLOW CHARTS FOR IMM, AND ASSOCIATED SUBROUTINES

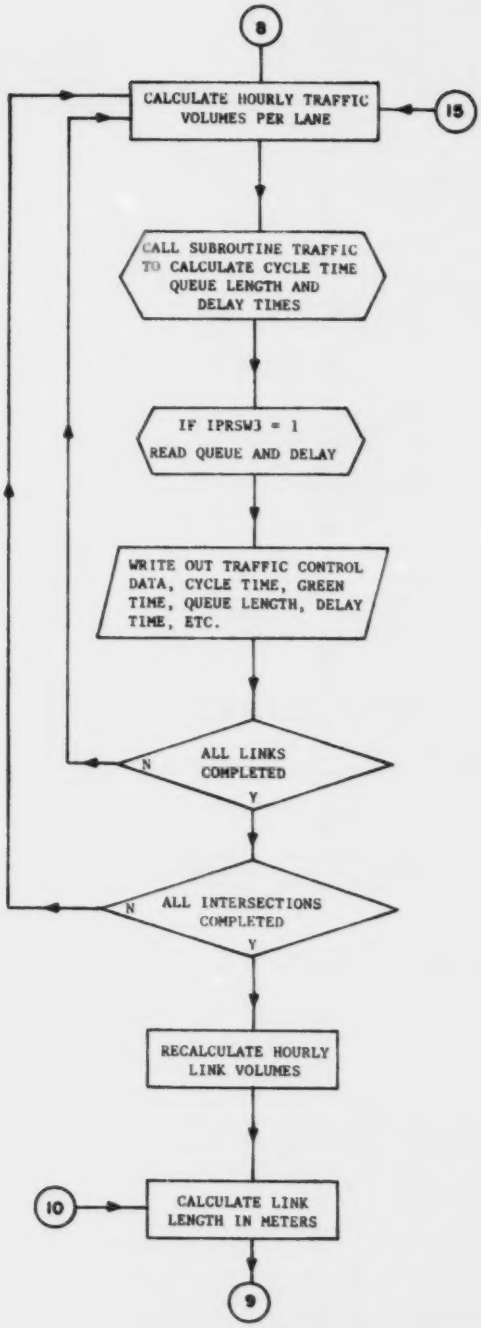

READ NUMBER OF HOURS, RECEPTORS AND INTERSECTIONS
WRITE OUT NUMBER OF HOURS, RECEPTORS AND INTERSECTIONS
3
READ SIGNALIZATION CODE AND COORDINATES OF THE INTERSECTION
WRITE OUT SIGNALIZATION AND COORDINATES OF THE INTERSECTION
READ IN TYPE OF SIGNALIZATION, NUMBER OF PHASES, AND GAP TIME
WRITE OUT TYPE OF SIGNALIZATION NUMBER OF PHASES AND GAP TIME
FIXED CYCLE TIME
Y
N
READ CY(INS), G(INS,J)
2
READ LINK CODE, AND LINK DESCRIPTORS
WRITE CYCLE TIME AND GREEN TIME FOR EACH PHASE
READ LANE CAPACITY, LINK VOLUME, VELOCITY AND ACCELERATION
DECELERATION > 0
Y
N
16
READ IN NUMBER OF LANES, AND FRACTION OF VOLUME FOR EACH LANE
ACCELERATION < 0
N
Y
16
WRITE OUT INPUT DATA
1

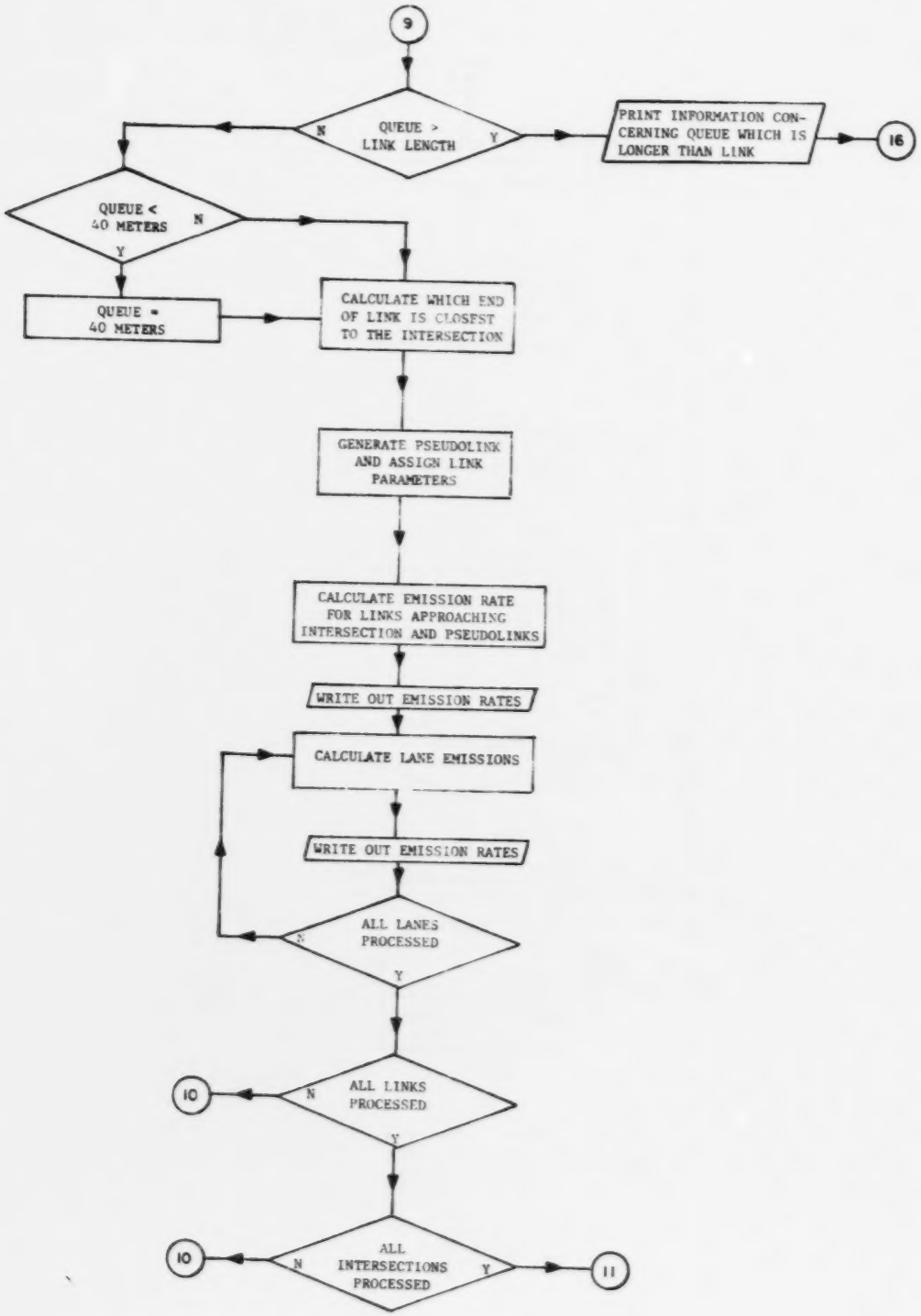

1
ALL LINKS FOR AN INTERSECTION READ
N
2
Y
ANY MORE INTERSECTIONS
Y
3
N
CALCULATE NUMBER OF LINKS GOING AWAY FROM THE INTERSECTION
READ PHYSICAL LINK PARAMETERS
READ LINK CAPACITY, VELOCITY, LANES, AND FRACTION OF VOLUME PER LANE
WRITE OUT INPUT DATA
ALL LINKS READ
N
Y
4

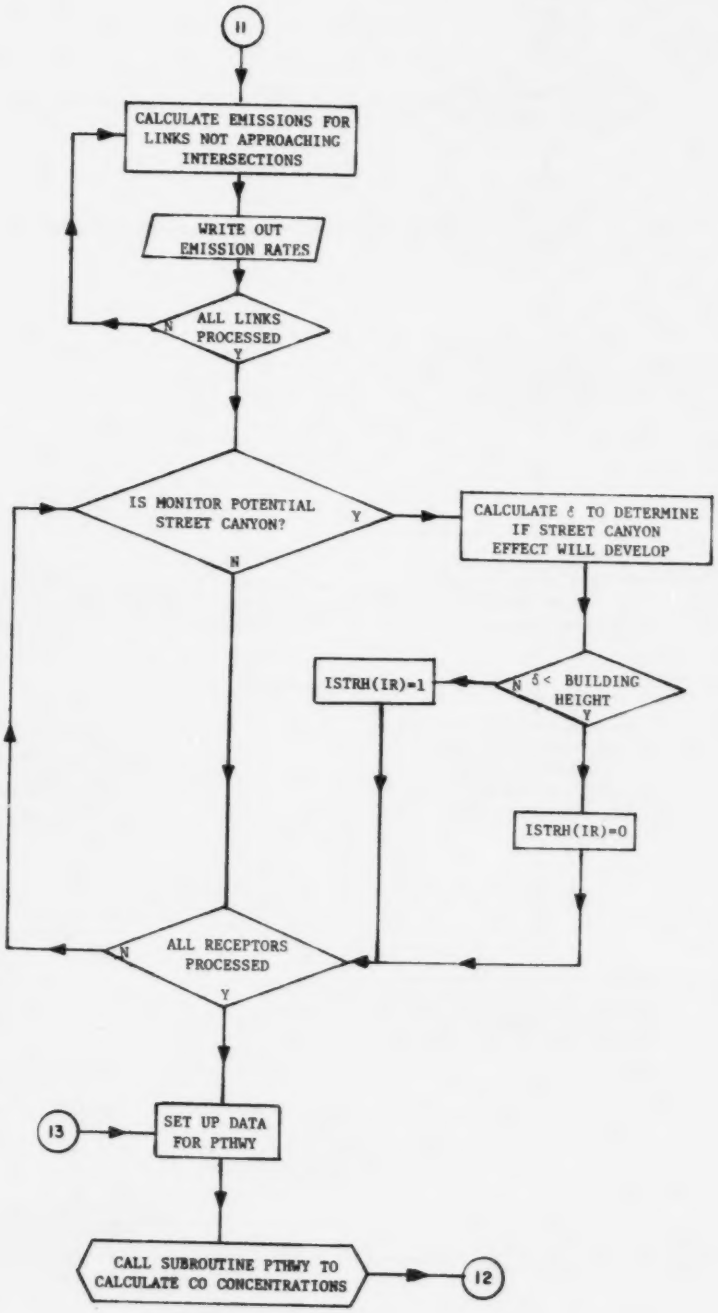

4
READ RECEPTOR COORDINATES AND STREET CANYON FLAG
POTENTIAL STREET CANYON
N
Y
READ THE LINK CODES FOR LINKS ADJACENT TO RECEPTOR
READ STREET HEADING, CANYON WIDHT, BUILDING HEIGHT AND SIDE OF THE STREET
N
ALL RECEPTORS READ IN
Y
WRITE OUT RECEPTOR DATA
READ WIND DIRECTION SPEED, MIXING HEIGHT AND STABILITY CLASS
WRITE OUT METEOROLOGICAL DATA
N
ALL MET DATA READ
Y
5

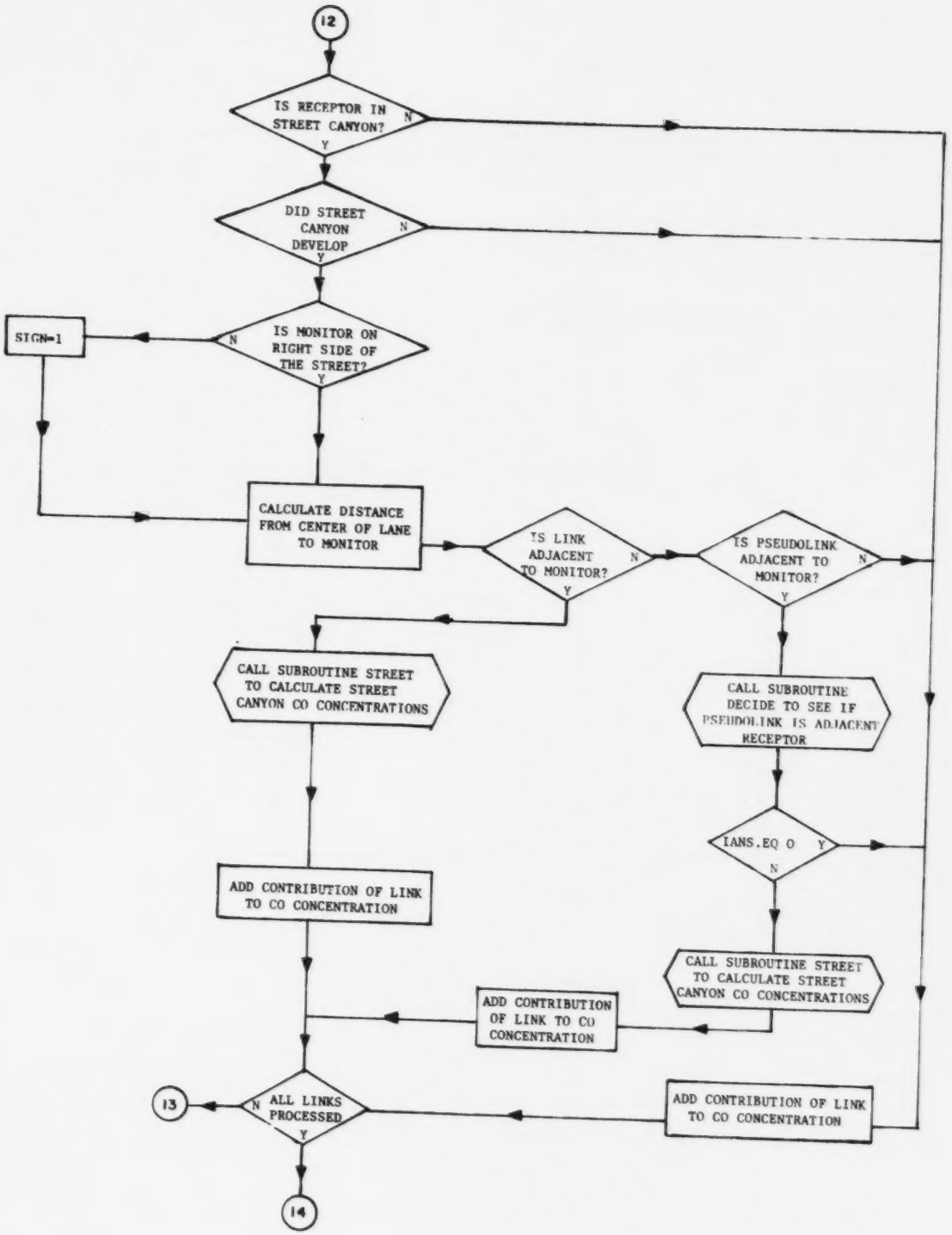

5
READ FACTOR FOR HOURLY TRAFFIC VOLUME
WRITE OUT FACTOR FOR HOURLY TRAFFIC VOLUME
READ IN VEHICLE DISTRIBUTION AND EMISSION PARAMETERS
WRITE PARAMETERS AND VEHICLE DISTRIBUTION
CALCULATE HOURLY TRAFFIC VOLUMES FOR EACH LINK
17
CALL SUBROUTINE SUP8 TO CALCULATE IDLING EMISSIONS
WRITE OUT IDLING EMISSIONS
CALL SUBROUTINE INITMM
7
CALL SUBROUTINE ACDC AND SUP8 TO CALCULATE ACCELERATION/DECELERATION EMISSIONS
WRITE OUT ACCELERATION AND DECELERATION EMISSIONS
6

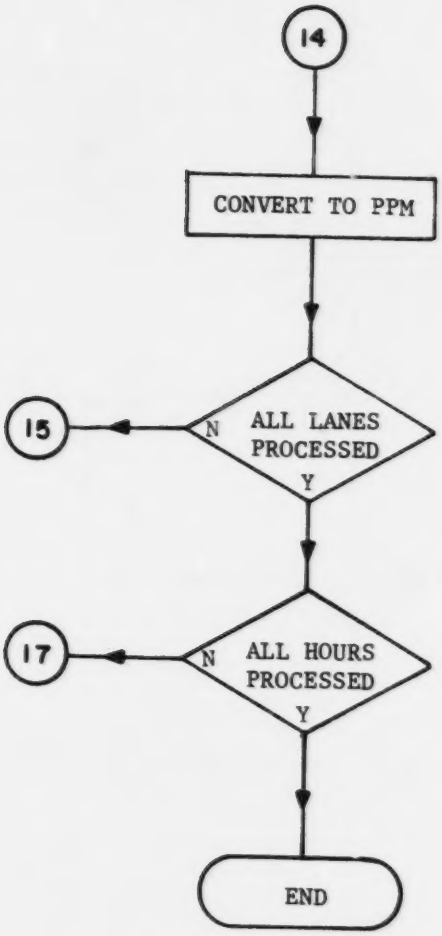

6
CALL SUBROUTINE CRUZ AND SUP8 TO CALCULATE CRUISE EMISSIONS
WRITE OUT EMISSIONS FOR THE VARIOUS OPERATION MODES
7
N
ALL LINKS APPROACHING INTERSECTION PROCESSED
Y
CALL SUBROUTINE CRUZ AND SUP8 TO CALCULATE CRUISE EMISSIONS
WRITE OUT CRUISE EMISSIONS FOR LINKS GOING AWAY FROM THE INTERSECTION
N
ALL LINKS PROCESSED
Y
8

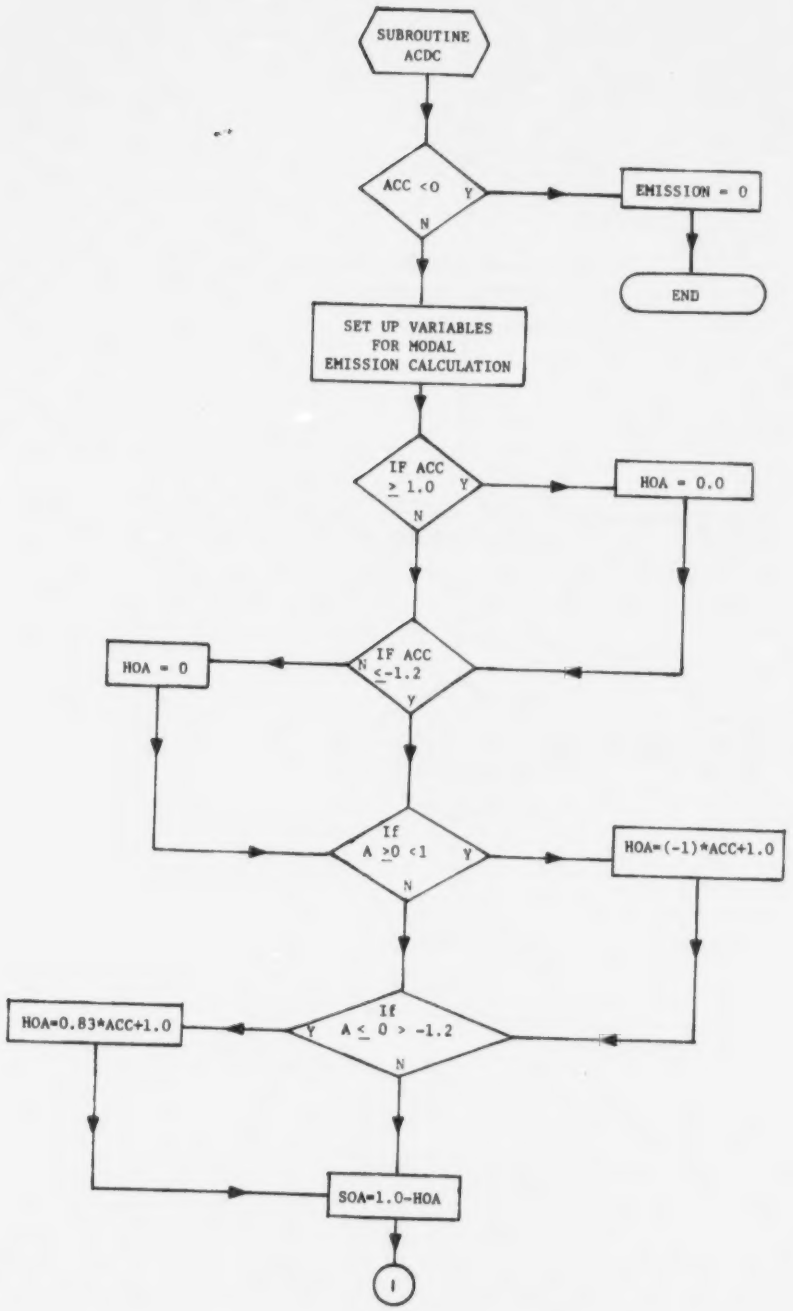

8
CALCULATE HOURLY TRAFFIC VOLUMES PER LANE
15
CALL SUBROUTINE TRAFFIC TO CALCULATE CYCLE TIME QUEUE LENGTH AND DELAY TIMES
IF IPRSWJ = 1
READ QUEUE AND DELAY
WRITE OUT TRAFFIC CONTROL DATA, CYCLE TIME, GREEN TIME, QUEUE LENGTH, DELAY TIME, ETC.
N
ALL LINKS COMPLETED
Y
N
ALL INTERSECTIONS COMPLETED
Y
RECALCULATE HOURLY LINK VOLUMES
10
CALCULATE LINK LENGTH IN METERS
9

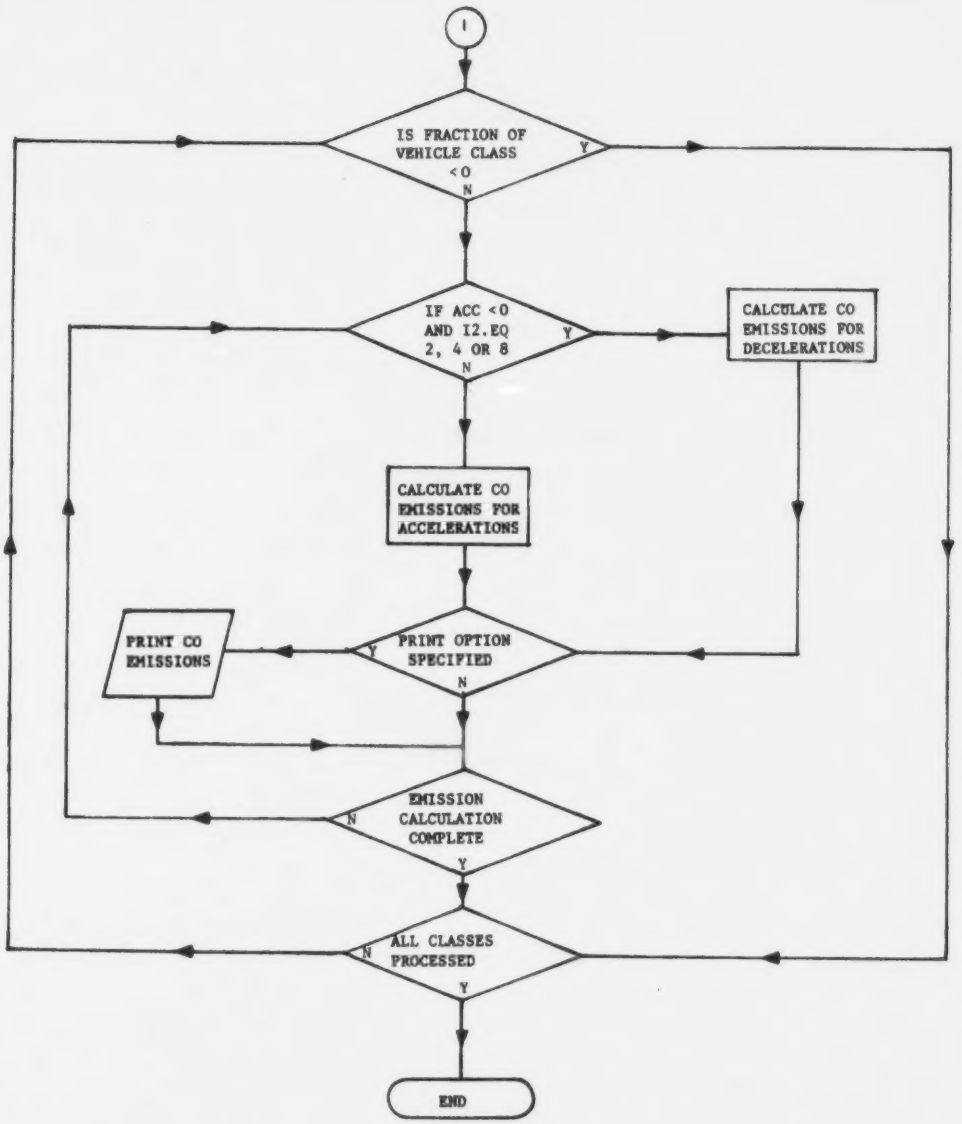

9
QUEUE > LINK LENGTH
N
Y
PRINT INFORMATION CONCERNING QUEUE WHICH IS LONGER THAN LINK
16
QUEUE < 40 METERS
N
Y
QUEUE = 40 METERS
CALCULATE WHICH END OF LINK IS CLOSEST TO THE INTERSECTION
GENERATE PSEUDOLINK AND ASSIGN LINK PARAMETERS
CALCULATE EMISSION RATE FOR LINKS APPROACHING INTERSECTION AND PSEUDOLINKS
WRITE OUT EMISSION RATES
CALCULATE LANE EMISSIONS
WRITE OUT EMISSION RATES
ALL LANES PROCESSED
N
Y
10
ALL LINKS PROCESSED
N
Y
10
ALL INTERSECTIONS PROCESSED
N
Y
11

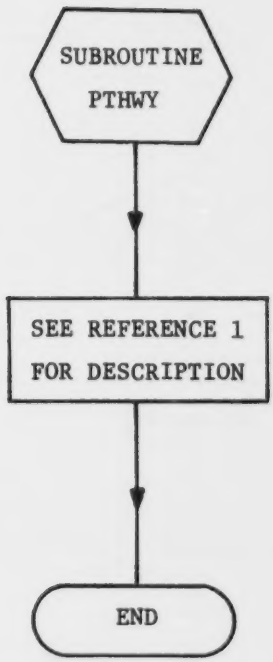

11
CALCULATE EMISSIONS FOR LINKS NOT APPROACHING INTERSECTIONS
WRITE OUT EMISSION RATES
ALL LINKS PROCESSED
N
Y
IS MONITOR POTENTIAL STREET CANYON?
Y
N
CALCULATE δ TO DETERMINE IF STREET CANYON EFFECT WILL DEVELOP
δ < BUILDING HEIGHT
N
Y
ISTRH(IR)=1
ISTRH(IR)=0
ALL RECEPTORS PROCESSED
N
Y
13
SET UP DATA FOR PTHWY
CALL SUBROUTINE PTHWY TO CALCULATE CO CONCENTRATIONS
12

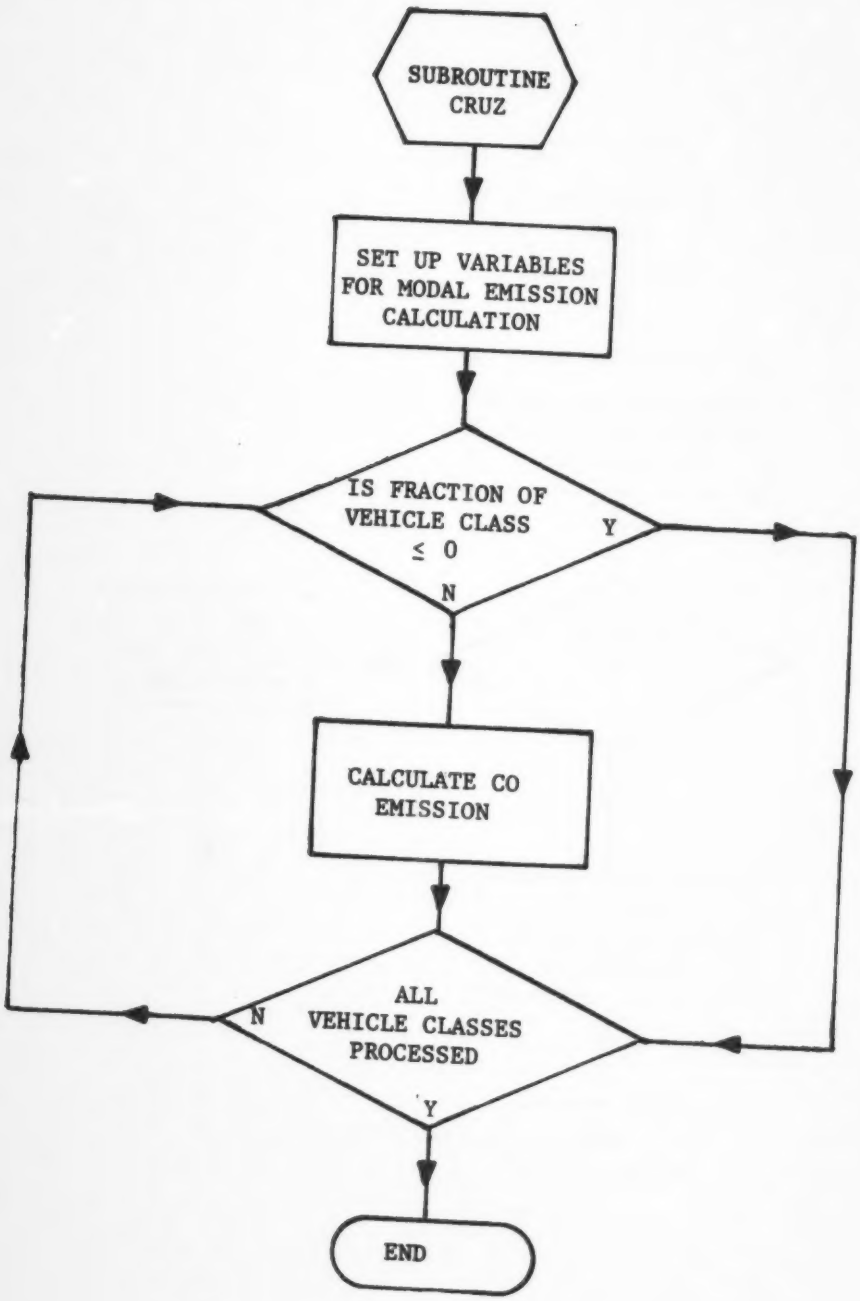

12
IS RECEPTOR IN STREET CANYON?
N
Y
DID STREET CANYON DEVELOP
N
Y
IS MONITOR ON RIGHT SIDE OF THE STREET?
N
Y
SIGN=1
CALCULATE DISTANCE FROM CENTER OF LANE TO MONITOR
IS LINK ADJACENT TO MONITOR?
N
Y
IS PSEUDOLINK ADJACENT TO MONITOR?
N
Y
CALL SUBROUTINE STREET TO CALCULATE STREET CANYON CO CONCENTRATIONS
CALL SUBROUTINE DECIDE TO SEE IF PSEUDOLINK IS ADJACENT RECEPTOR
IANS.EQ 0
Y
N
ADD CONTRIBUTION OF LINK TO CO CONCENTRATION
CALL SUBROUTINE STREET TO CALCULATE STREET CANYON CO CONCENTRATIONS
ADD CONTRIBUTION OF LINK TO CO CONCENTRATION
ALL LINKS PROCESSED
N
Y
13
ADD CONTRIBUTION OF LINK TO CO CONCENTRATION
14

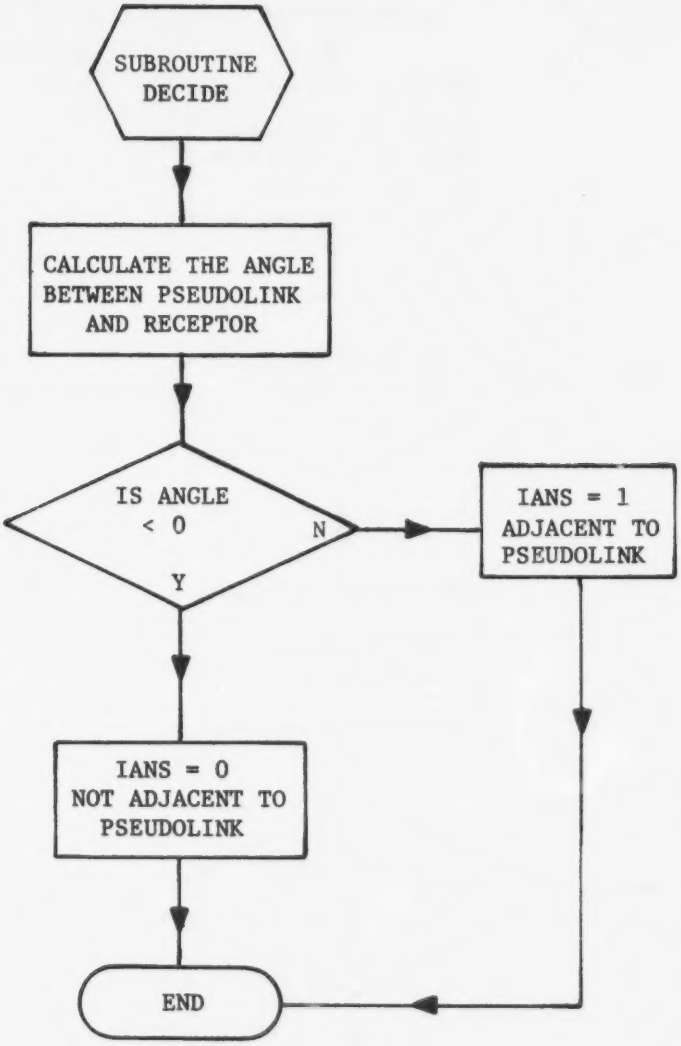

14
CONVERT TO PPM
15
N
ALL LANES PROCESSED
Y
17
N
ALL HOURS PROCESSED
Y
END

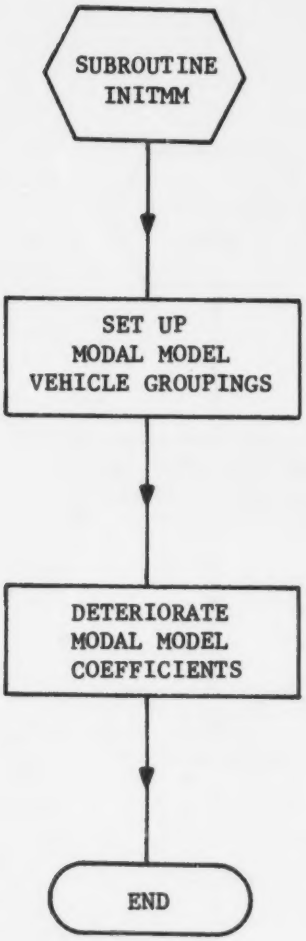

SUBROUTINE ACDC
ACC <0
Y
N
EMISSION = 0
END
SET UP VARIABLES FOR MODAL EMISSION CALCULATION
IF ACC ≥ 1.0
Y
N
HOA = 0.0
IF ACC ≤-1.2
N
Y
HOA = 0
If A ≥0 <1
Y
N
HOA=(-1)*ACC+1.0
If A ≤ 0 > -1.2
Y
N
HOA=0.83*ACC+1.0
SOA=1.0-HOA
1


1
IS FRACTION OF VEHICLE CLASS < 0
Y
N
IF ACC < 0 AND I2.EQ 2, 4 OR 8
Y
N
CALCULATE CO EMISSIONS FOR DECELERATIONS
CALCULATE CO EMISSIONS FOR ACCELERATIONS
PRINT OPTION SPECIFIED
Y
N
PRINT CO EMISSIONS
EMISSION CALCULATION COMPLETE
N
Y
ALL CLASSES PROCESSED
N
Y
END

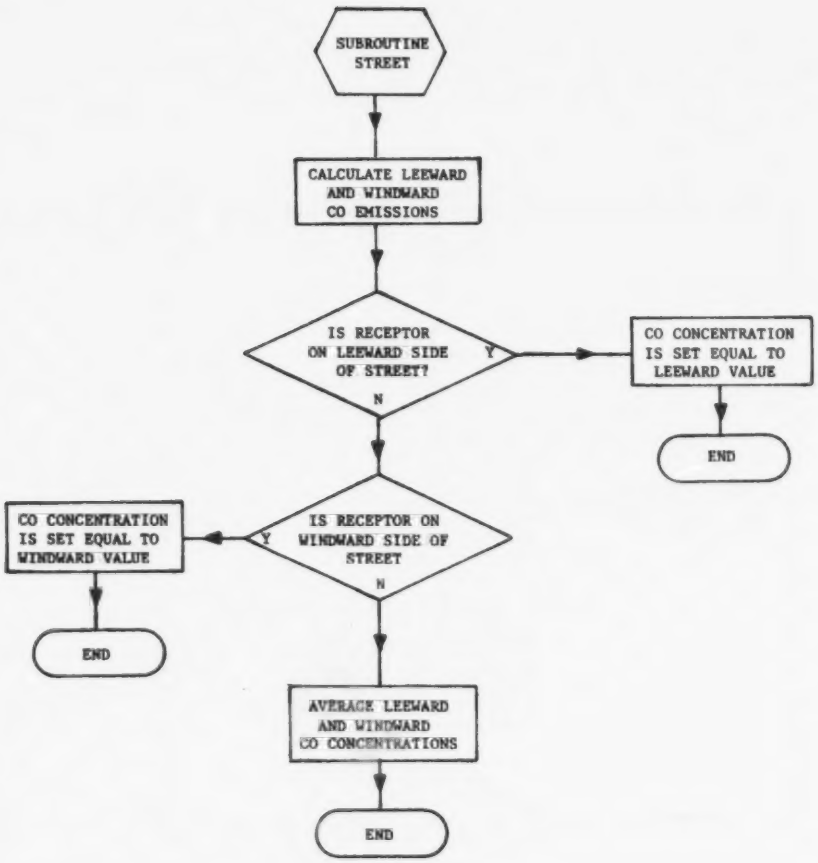

SUBROUTINE
PTHWY
SEE REFERENCE 1
FOR DESCRIPTION
END

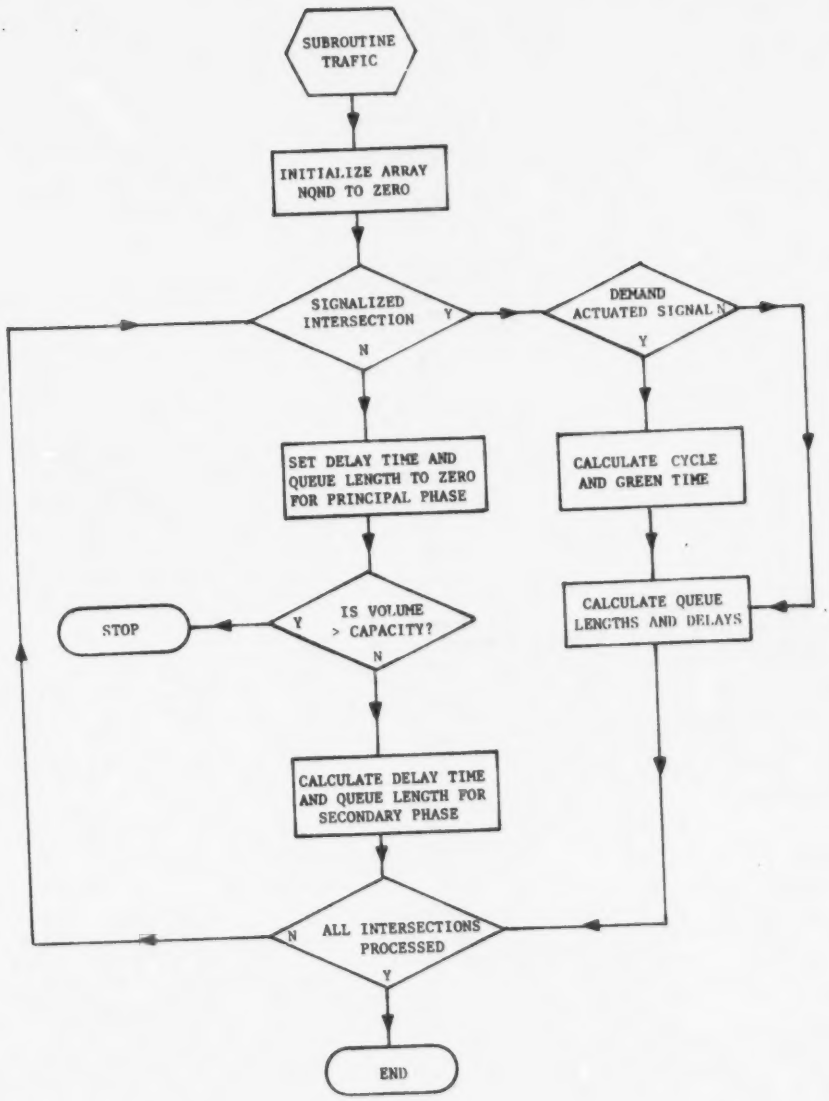

SUBROUTINE CRUZ
SET UP VARIABLES FOR MODAL EMISSION CALCULATION
IS FRACTION OF VEHICLE CLASS ≤ 0
Y
N
CALCULATE CO EMISSION
ALL VEHICLE CLASSES PROCESSED
N
Y
END


SUBROUTINE
DECIDE
CALCULATE THE ANGLE
BETWEEN PSEUDOLINK
AND RECEPTOR
IS ANGLE
< 0
N
Y
IANS = 1
ADJACENT TO
PSEUDOLINK
IANS = 0
NOT ADJACENT TO
PSEUDOLINK
END


SUBROUTINE
INITMM
SET UP
MODAL MODEL
VEHICLE GROUPINGS
DETERIORATE
MODAL MODEL
COEFFICIENTS
END

SUBROUTINE
SUB8
SEE REFERENCE 11
FOR DESCRIPTION
END


SUBROUTINE STREET
CALCULATE LEEWARD AND WINDWARD CO EMISSIONS
IS RECEPTOR ON LEEWARD SIDE OF STREET?
Y
N
CO CONCENTRATION IS SET EQUAL TO LEEWARD VALUE
END
IS RECEPTOR ON WINDWARD SIDE OF STREET
Y
N
CO CONCENTRATION IS SET EQUAL TO WINDWARD VALUE
END
AVERAGE LEEWARD AND WINDWARD CO CONCENTRATIONS
END


SUBROUTINE TRAFIC
INITIALIZE ARRAY NQND TO ZERO
SIGNALIZED INTERSECTION
Y
N
DEMAND ACTUATED SIGNAL
N
Y
SET DELAY TIME AND QUEUE LENGTH TO ZERO FOR PRINCIPAL PHASE
CALCULATE CYCLE AND GREEN TIME
STOP
Y
IS VOLUME > CAPACITY?
N
CALCULATE QUEUE LENGTHS AND DELAYS
CALCULATE DELAY TIME AND QUEUE LENGTH FOR SECONDARY PHASE
N
ALL INTERSECTIONS PROCESSED
Y
END

APPENDIX C

SAMPLE PROBLEM

This appendix contains the sample data input, and the output generated by IMM. The job control statements have not been included since the procedures required to run programs varies from one installation to another. Figure C-1 displays the general layout of the intersection which has been modeled, and the location of the receptors. Figure C-2 contains the input data cards for the sample problem, and Figure C-3 contains the output generated by the program.

The preliminary step in modeling the CO air quality in the vicinity of an intersection is to lay out the intersection on graph paper with the x-axis aligned along the west-east direction, and the y-axis along the south-north direction. Once the intersection is drawn to scale, the necessary coordinates and dimensions can be easily extracted from the graph.

The input formats for all the data cards is specified in Table 1. However, to help keep track of the sequence of input cards, the card numbers which appear in Table 1 have been inserted into the last columns of the data cards listed in Figure C-2. The example intersection will be analyzed for 2 hours with five receptors distributed about the intersection. Additionally, this is considered to be an isolated intersection which is not connected to any adjacent intersection. On the second card, it is specified that the intersection is signalized, and the approximate coordinates of the center of the intersection are coded on the card. The third data card requires additional information about the intersection, that is, the type of signalization, number of phases, and the gap acceptance time if it is an unsignalized intersection. Since this example is for a vehicle actuated signal, card 3a, on which the cycle and green times would have been noted, is not required. The next group of cards (4 through 7) are required to define the physical characteristics of each link approaching the intersection, and the volume and travel characteristics of the link. Since only one intersection is being modeled, only four links are read, however, if additional intersections were being modeled, all links approaching the intersections would be read at this time.

When all links approaching an intersection have been defined, the cards (8 through 10) which define the links leaving the intersection are read. The required data defines the physical link characteristics, and the travel characteristics of the link.

Once all the links have been read into the computer, the receptor sites are defined. If the receptor is in a street canyon, two additional cards are required. Card 11a requires the link number for those links adjacent to the

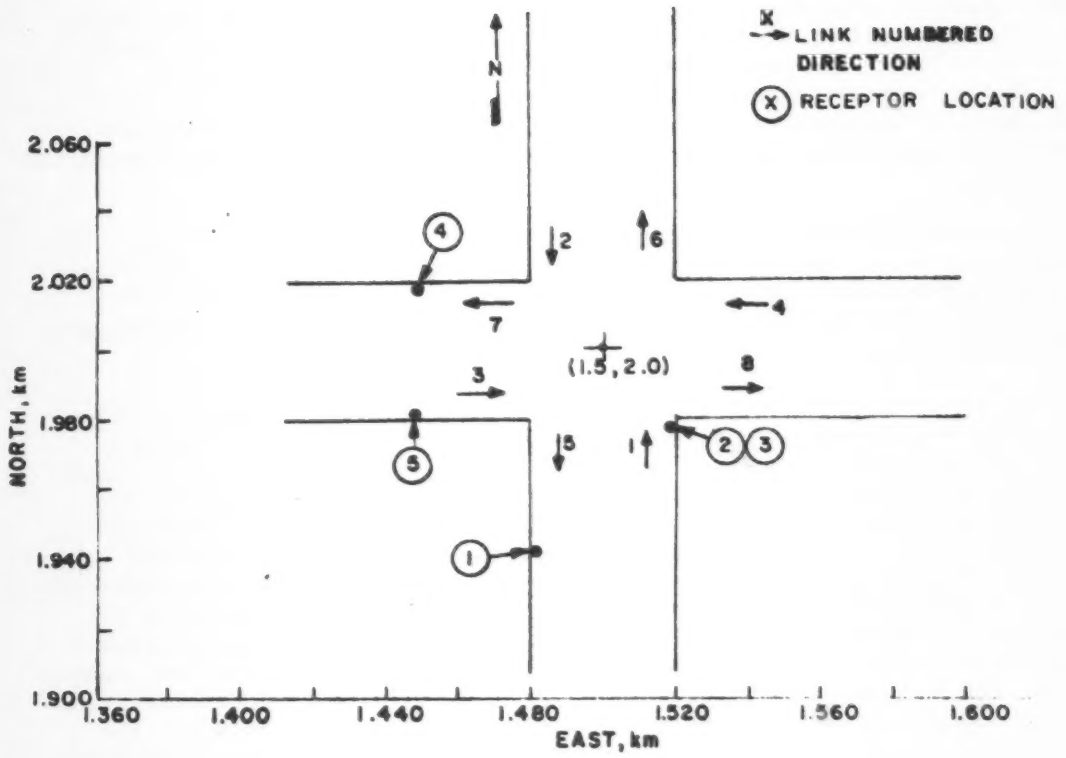


Figure C-1. Sample intersection.

```
@ELT.L  IMMDATA
ELT007 SL73P1 07/12/79 08:36:46 (7.)
000001    003        1    1    0    1
000002    003        2    1    1                                                                  1
000003    003             1 1.500    2.000                                                        2
000004    003        1    2    0                                                                  3
000005    003        1                                                                            4
000006    003   1.510     1.520     1.510     1.990     10.0      0.5       0.0       0.0         5
000007    003   2100.     500.      25.0      25.0      -2.5      2.0                             6
000008    003   2.0       0.5       0.5                                                           7
000009    003        2                                                                            4
000010    003   1.490     2.020     1.490     2.520     15.0      0.5       0.0       0.0         5
000011    003   1800.     400.      25.0      10.0      -2.0      2.5                             6
000012    003   2.0       0.5       0.5                                                           7
000013    003        3                                                                            4
000014    003   0.480     1.990     1.480     1.990     5.0       0.5       0.0       0.0         5
000015    003   1200.     250.      20.0      10.0      -2.0      2.0                             6
000016    003   1.0       1.0                                                                     7
000017    003        4                                                                            4
000018    003   1.520     2.010     2.020     2.010     5.0       0.5       0.0       0 0         5
000019    003   1200.     250.      20.0      10.0      -2.0      2.0                             6
000020    003   1.0       1.0                                                                     7
000021    003   1.490     1.520     1.490     1.990     7.5       0.5       0.0       0.0         8
000022    003   400.      20.0                                                                    9
000023    003   2.0       0.5       0.5                                                          10
000024    003   1.510     2.020     1.510     2.520     7.50      0.5       0.0       0.0         8
000025    003   400.      25.0                                                                    9
000026    003   2.0       0.6       0.4                                                          10
000027    003   0.480     2.010     1.480     2.010     5.0       0.5       0.0       0.0         8
000028    003   300.      20.0                                                                    9
000029    003   1.0       1.0                                                                    10
000030    003   1.520     1.990     2.020     1.990     5.0       0.5       0.0       0.0         8
000031    003   300.      20.0                                                                    9
000032    003   1.0       1.0                                                                    10
000033    003   1.480     1.970     1.0                 0                                         11
000034    003   1.520     1.980     1.0                 0                                         11
000035    003   1.520     1.980     4.0                 0                                         11
000036    003   1.470     2.020     1.0                 1                                         11
000037    003        2    3    7                                                                 11A
000038    003   90.0      50.0      50.0                2                                         11B
000039    003   1.470     1.980     1.0                 1                                         11
000040    003        2    3    7                                                                 11A
000041    003   90.0      50.0      50.0                1                                         11B
000042    003   5.0       1.5       500.0               3 72.0     5.0       20.0                 12
000043    003   40.0      2.0       500.0               4                                         12
000044    003   1.0       0.4                                                                     13
000045    003       77    1      0.88      0.05      0.07      0.02      0.02      0.0           14
000046    003        0                                                                            15
000047    003        0                                                                            16
000048    003        0                                                                            17

END ELT.

WORKFT PRINTS
```

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receptor, and card 11b requires the dimensions and orientation of the street canyon. After all site data has been input, the meteorological data and the fraction hot/cold start data for each hour is read. Card 13 contains the fraction of the traffic volume which was read on cards 6 and 9 which will be used for each hour of simulation. Alternatively, the volumes on cards 6 and 9 can be the average daily traffic (ADT), and card 13, would contain the fraction of ADT for each hour of the day. Each card 13 will have up to eight hourly ratios, and if more than 8 hours are modeled, additional card 13 will be required. Card 14 contains information required to correct the CO emissions for hot/cold starts and correct the emissions to correspond to the vehicle distribution at the intersection being modeled.

The next input, card 15, specifies the fraction of vehicles in each of the 11 categories utilized in the Modal Emission Model. The following cards (16 through 18) contain 4 coefficients per card, and represent the 12 modal coefficients, which are required for each of the 11 categories in the Modal Emission Model.

As a result of the input data in Figure C-2, the IMM model generates the data in Figure C-3. The initial data in Figure C-3 repeats the input data, and this section should be reviewed carefully to ascertain that the links have been properly defined, and utilize the correct travel data. Similarly, the receptor data, meteorological data, hourly volume ratios, and vehicle distributions should be checked to insure that the appropriate values were input to the model. The Modal Emission Factors should be reviewed the first time this data is utilized, to check that no transcription or key punching errors were made.

After all the input has been printed, the model prints the contribution from each link to each receptor. For each link approaching a signalized intersection, there is a queue. The queues are assigned link numbers by the program beginning one higher than the total number of links input to the model. In this sample case, the queue emissions are assigned link numbers 9 through 12. After all link contributions to the receptors has been determined for 1 hour, the CO concentrations are adjusted to account for the distribution of light and heavy-duty vehicles, and the fraction of hot/cold starts. The corrected concentration for each receptor are then printed.

NUMBER OF HOURS FOR THE SIMULATION= 2
NUMBER OF RECEPTORS= 2
NUMBER OF INTERSECTIONS 1

FOR INTERSECTION 1 FG FREE FLOW CONDITIONS ASSUMED

INTERSECTION 1 IS CONTROLLED BY A DEMAND ACTUATED SIGNAL

CENTER OF INTERSECTION IS 1.500 KM EAST AND 2.000 KM NORTH

INPUT DATA FOR LINK 1

X1 = 1.510 Y1 = 1.020 X2 = 1.510 Y2 = 1.980 KM

NUMBER OF LANES = 2

FRACTION OF LINK 1 VOLUME ON LANE 1 = .50

FRACTION OF LINK 1 VOLUME ON LANE 2 = .50

LINK WIDTH = 10.00 METERS EMISSION HEIGHT = .50 METERS

LINK IS AT GRADE

CAPACITY = 2100.0 VECHICLES/HOUR VOLUME = 500.0 VECHICLES/HOUR
SPEED INTO INTERSECTION = 25.0 MI/HR SPEED OUT OF INTERSECTION = 25.0 MI/HR
ACCELERATION INTO INTERSECTION = -2.50 MI/HR/SEC ACCELERATION OUT OF INTERSECTION = 2.00 MI/HR/SEC

INPUT DATA FOR LINK 2

X1 = 1.490 Y1 = 2.020 X2 = 1.490 Y2 = 2.520 KM

NUMBER OF LANES = 2

FRACTION OF LINK 2 VOLUME ON LANE 1 = .50

FRACTION OF LINK 2 VOLUME ON LANE 2 = .50

LINK WIDTH = 15.00 METERS EMISSION HEIGHT = .50 METERS

LINK IS AT GRADE

CAPACITY = 1800.0 VECHICLES/HOUR VOLUME = 400.0 VECHICLES/HOUR
SPEED INTO INTERSECTION = 25.0 MI/HR SPEED OUT OF INTERSECTION = 10.0 MI/HR
ACCELERATION INTO INTERSECTION = -2.50 MI/HR/SEC ACCELERATION OUT OF INTERSECTION = 2.50 MI/HR/SEC

INPUT DATA FOR LINK 3

X1 = .480 Y1 = 1.990 X2 = 1.480 Y2 = 1.990 KM

NUMBER OF LANES = 1

FRACTION OF LINK 3 VOLUME ON LANE 1 = 1.00

LINK WIDTH = 5.00 METERS EMISSION HEIGHT = .50 METERS

LINK IS AT GRADE

CAPACITY = 1200.0 VECHICLES/HOUR VOLUME = 250.0 VECHICLES/HOUR
SPEED INTO INTERSECTION = 20.0 MI/HR SPEED OUT OF INTERSECTION = 10.0 MI/HR
ACCELERATION INTO INTERSECTION = -2.00 MI/HR/SEC ACCELERATION OUT OF INTERSECTION = 2.00 MI/HR/SEC

INPUT DATA FOR LINK 4

X1 = 1.520 Y1 = 2.010 X2 = 2.020 Y2 = 2.010 KM

NUMBER OF LANES = 1

FRACTION OF LINK 4 VOLUME ON LANE 1 = 1.00

LINK WIDTH = 5.00 METERS EMISSION HEIGHT = .50 METERS

LINK IS AT GRADE

CAPACITY = 1200.0 VECHICLES/HOUR VOLUME = 250.0 VECHICLES/HOUR
SPEED INTO INTERSECTION = 20.0 MI/HR SPEED OUT OF INTERSECTION = 10.0 MI/HR
ACCELERATION INTO INTERSECTION = -2.00 MI/HR/SEC ACCELERATION OUT OF INTERSECTION = 2.00 MI/HR/SEC

THE FOLLOWING DATA APPLIES TO THOSE LINKS WHICH DO NOT APPROACH ANY INTERSECTION

INPUT DATA FOR LINK 5

X1 = 1.490 Y1 = 1.520 X2 = 1.490 Y2 = 1.980 KM

LINK WIDTH = 7.50 METERS EMISSION HEIGHT = .50 METERS

LINK IS AT GRADE

NUMBER OF LANES = 2

FRACTION OF LINK 5 VOLUME ON LANE 1 = .50

FRACTION OF LINK 5 VOLUME ON LANE 2 = .50

VOLUME= 400.00 VEHICLES/HOUR SPEED= 20.00 MI/HR

INPUT DATA FOR LINK 6

X1 = 1.510 Y1 = 2.020 X2 = 1.510 Y2 = 2.520 KM

LINK WIDTH = 7.50 METERS EMISSION HEIGHT = .50 METERS

LINK IS AT GRADE

NUMBER OF LANES = 2

FRACTION OF LINK 6 VOLUME ON LANE 1 = .60

FRACTION OF LINK 6 VOLUME ON LANE 2 = .40

VOLUME= 400.00 VEHICLES/HOUR SPEED= 25.00 MI/HR

INPUT DATA FOR LINK 7

X1 = .480 Y1 = 2.010 X2 = 1.480 Y2 = 2.010 KM

LINK WIDTH = 5.00 METERS EMISSION HEIGHT = .50 METERS

LINK IS AT GRADE

NUMBER OF LANES = 1

FRACTION OF LINK 7 VOLUME ON LANE 1 = 1.00

VOLUME= 300.00 VEHICLES/HOUR SPEED= 20.00 MI/HR

INPUT DATA FOR LINK 6

X1 = 1.980 Y1 = 1.990 X2 = 2.020 Y2 = 1.990 KM

LINK WIDTH = 5.00 METERS EMISSION HEIGHT = .50 METERS

LINK IS AT GRADE

NUMBER OF LANES = 1

FRACTION OF LINK 6 VOLUME ON LANE 1 = 1.00

VOLUME= 300.00 VEHICLES/HOUR SPEED= 20.00 MI/HR

TOTAL NUMBER OF LINKS IS 8
OF WHICH 4 ARE LINKS WHICH DO NOT APPROACH ANY INTERSECTION

DATA FOR RECEPTOR 1

XX= 1.437 YY= 1.970 Z= 1.00

DATA FOR RECEPTOR 2

XX= 1.520 YY= 1.980 Z= 1.00

DATA FOR RECEPTOR 3

XX= 1.520 YY= 1.980 Z= 4.00

DATA FOR RECEPTOR 4

XX= 1.470 YY= 2.020 Z= 1.00
LINKS ADJACENT TO THE STREET CANYON RECEPTOR= 3 7
STREET HEADING FROM NORTH= 90.00 DEGREES
STREET WIDTH= 50.00 METERS
BUILDING HEIGHT= 50.00 METERS
IF ONE FACES TOWARD THE DIRECTION OF THE STREET HEADING
THE RECEPTOR IS ON THE LEFT SIDE OF THE STREET

DATA FOR RECEPTOR 5

XX= 1.470 YY= 1.980 Z= 1.00
LINKS ADJACENT TO THE STREET CANYON RECEPTOR= 3 7
STREET HEADING FROM NORTH= 90.00 DEGREES
STREET WIDTH= 50.00 METERS
BUILDING HEIGHT= 50.00 METERS
IF ONE FACES TOWARD THE DIRECTION OF THE STREET HEADING
THE RECEPTOR IS ON THE RIGHT SIDE OF THE STREET

METEOROLOGICAL INPUTS FOR HOUR 1
WIND DIRECTION 5.00 DEGREES
WIND SPEED= 1.50 METERS/SEC
MIXING HEIGHT= 500.00 METERS
STABILITY CLASS= 7
TEMPERATURE = 72.0
HOT STARTS = 5.00 COLD STARTS =20.00

METEOROLOGICAL INPUTS FOR HOUR 2
WIND DIRECTION 40.00 DEGREES
WIND SPEED= 2.00 METERS/SEC
MIXING HEIGHT= 500.00 METERS
STABILITY CLASS= 4
TEMPERATURE = .0
HOT STARTS = .00 COLD STARTS = .00

HOURLY RATIOS OF VOLUME TO AVERAGE VOLUME

1.00 .40

77 REGION= 1 MODAL SPLIT= .88, .05, .03, .02, .02, .00,

EMISSION FACTOR CALCULATION SUBROUTINE SUB8 (MOBILE1 PROGRAM MODIFIED)

* TOTAL HC EMISSION FACTORS INCLUDE EVAP. HC EMISSION FACTORS

CAL. YEAR: 1977 TEMP: 72.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD HC
REGION: 4G-STATE 5.0/ 5.0/ 5.0 MPH (5.0) .820/ .050/ .030/ .020/ .020/ .000
20.0/ 5.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	18.70	20.97	28.37	94.90	8.19	33.72	20.42
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	224.81	237.75	304.25	762.76	76.55	120.68	235.63
EXHAUST NOX:	2.94	3.02	5.27	9.37	32.37	.15	3.73

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	2.05	2.41	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.93	31.02	44.09	42.92	.93	10.55	30.09
IDLE NOX:	.34	.26	.28	.03	1.04	.01	.34

.10210419+01	-.46106476-01	.12750413-01	.19804664-01
.10467151-02	-.15174127+00	.19598060-01	-.79918522-04
-.27255622-03	.33066291+00	-.24132896-02	.32060244-03
.53576120+00	-.24510358-01	.43812852-01	.49628541-02
.44959130-03	-.47973134-01	.61538182-02	.10994070-04
-.57511966-04	.30338836+00	-.27355787-02	.13473761-03
.28047038+00	-.47583580-02	.43524541-01	.13808063-02
.10754802-03	-.21531656-02	.92090301-03	.11250070-04
-.19257031-05	.22921783+00	-.40214434-02	.12248126-03
.49613750+00	-.14627926-01	.61504323-01	-.10729437-02
.21256545-03	-.68023652-02	.97647379-03	.10525828-03
.37405029-04	.26291054+00	-.18189936-02	.84008745-04
.50064710+00	-.17586585-01	.59339337-01	-.13133272-02
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CAL. YEAR: 1977     TEMP: 72.0(F)        .880/ .050/ .030/ .020/ .020/ .000
REGION: 49-STATE    12.5/12.5/12.5 MPH ( 5.0)        20.0/  5.0/ 20.0

                    COMPOSITE EMISSION FACTORS (GM/MILE)
              LDV     LDT1    LDT2    HDG     HDD     MC     ALL MODES
  TOTAL HC:   9.12   10.22   14.01   48.17    5.86   15.70    10.04
  *EVAP HC:   2.02    2.22    3.10    2.92     .00    1.94     ----
EXHAUST  CO:  90.18   96.23  120.21  424.90   46.00   51.93    97.19
EXHAUST NOX:   2.77    2.77    4.57   10.06   24.73     .12     3.37

                    CORRECTED IDLE EMISSION FACTORS (GM/MIN)
  IDLE  HC:   2.05    2.40    4.36    4.05     .44    4.94     2.15
  IDLE  CO:  29.93   31.02   44.09   42.93     .93   10.55    30.09
  IDLE NOX:    .34     .28     .28     .03    1.04     .01      .34
-----------------------------------------------------------------------
                         VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
CAL. YEAR: 1977     TEMP: 75.0(F)       1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE    12.5/12.5/12.5 MPH ( 5.0)         .0/   .0/   .0

                    COMPOSITE EMISSION FACTORS (GM/MILE)
              LDV     LDT1    LDT2    HDG     HDD     MC     ALL MODES
  TOTAL HC:   7.70    8.66   11.90   48.17    5.86   13.76     7.70
  *EVAP HC:   2.02    2.22    3.10    2.92     .00    1.94     ----
EXHAUST  CO:  73.13   78.42   98.59  424.90   46.00   44.13    73.13
EXHAUST NOX:   2.46    2.50    4.20   10.06   24.73     .11     2.46

                    CORRECTED IDLE EMISSION FACTORS (GM/MIN)
  IDLE  HC:   1.66    1.94    3.52    4.05     .44    4.25     1.66
  IDLE  CO:  25.17   26.29   37.67   42.93     .93    8.96    25.17
  IDLE NOX:    .28     .24     .24     .03    1.04     .01      .28
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CAL. YEAR: 1977    TEMP: 72.0(F)        .850/ .050/ .030/ .020/ .020/ .000
REGION: 49-STATE   12.5/12.5/12.5 MPH ( 5.0)        20.0/  5.0/ 20.0

                   COMPOSITE EMISSION FACTORS (GM/MILE)
              LDV     LDT1    LDT2    HDG     HDD     MC     ALL MODES
  TOTAL HC:   9.12    10.22   14.01   48.17   5.86   15.70    10.04
  *EVAP HC:   2.02     2.22    3.10    2.92    .00    1.94     ----
EXHAUST CO:  90.18    96.23  120.21  424.90  46.00   51.93    97.19
EXHAUST NOX:  2.73     2.77    4.57   10.06  24.73     .12     3.37

                   CORRECTED IDLE EMISSION FACTORS (GM/MIN)
  IDLE HC:   2.05     2.40    4.36    4.05    .44    4.94     2.15
  IDLE CO:  29.93    31.02   44.09   42.93    .93   10.55    30.09
  IDLE NOX:   .34      .28     .28     .03   1.04     .01      .34
-----------------------------------------------------------------------
                        VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
CAL. YEAR: 1977    TEMP: 75.0(F)       1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE   12.5/12.5/12.5 MPH ( 5.0)        [illegible] .0/   .0/   .0

                   COMPOSITE EMISSION FACTORS (GM/MILE)
              LDV     LDT1    LDT2    HDG     HDD     MC     ALL MODES
  TOTAL HC:   7.70     [illegible].68   11.90   48.17   5.86   13.76     7.70
```

*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	73.13	77.42	98.59	424.90	46.00	44.13	73.13
EXHAUST NOX:	2.46	2.96	4.60	10.06	24.73	.11	2.46

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

ACCELERATION EMISSIONS FOR INTERSECTION 1 PHASE 1 APPROACH 1 = .8991+01 GM/VEHICLE

CAL. YEAR: 1977 VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE TEMP: 72.0(F) .880/ .050/ .030/ .020/ .020/ .000
25.0/25.0/25.0 MPH (5.0) 20.0/ 5.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	6.11	6.65	9.60	22.01	3.77	10.07	6.53
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	49.59	53.42	65.55	211.97	24.05	30.57	52.99
EXHAUST NOX:	3.17	3.21	5.47	11.21	19.18	.13	3.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	2.05	2.40	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.97	31.02	44.09	42.93	.93	10.55	30.09
IDLE NOX:	.34	.28	.28	.03	1.04	.01	.34

CAL. YEAR: 1977 VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
25.0/25.0/25.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.26	5.91	8.36	22.01	3.77	9.93	5.26
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	36.71	42.16	51.56	211.97	24.05	25.98	38.71
EXHAUST NOX:	2.93	2.96	5.19	11.21	19.18	.12	2.93

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

CRUISE EMISSIONS FOR INTERSECTION 1 PHASE 1 APPROACH 1 = .2506+00 GM/VEHICLE/SEC

X(I) = 12.50 -156.25 -25.00 312.50 2604.17 50.00 -625.00-5208.3310416.67 12.50 -156.25 2604.17
DDA = 1.0 HDA = .0

EMAD =	.685	2	1
EMAD =	.355	2	2
EMAD =	.260	2	3
EMAD =	.127	2	4
EMAD =	.229	2	5
EMAD =	.121	2	6
EMAD =	.252	2	7
EMAD =	.247	2	8
EMAD =	.287	2	9
EMAD =	.649	4	1
EMAD =	.316	4	2
EMAD =	.428	4	3

EMAD = .445 4 4
EMAD = .479 4 5
EMAD = .452 4 6
EMAD = .493 4 7
EMAD = .461 4 8
EMAD = .484 4 9
EMAD = 1.015 5 1
EMAD = .782 5 2
EMAD = .656 5 3
EMAD = .704 5 4
EMAD = .755 5 5
EMAD = .702 5 6
EMAD = .763 5 7
EMAD = .730 5 8
EMAD = .743 5 9
EMAD = 1.322 6 1
EMAD = 1.081 6 2
EMAD = .910 6 3
EMAD = .982 6 4
EMAD = 1.031 6 5
EMAD = 1.006 6 6
EMAD = 1.021 6 7
EMAD = .969 6 8
EMAD = 1.017 6 9
EMAD = 1.739 7 1
EMAD = 1.392 7 2
EMAD = 1.123 7 3
EMAD = 1.285 7 4
EMAD = 1.360 7 5
EMAD = 1.375 7 6
EMAD = 1.380 7 7
EMAD = 1.268 7 8
EMAD = 1.358 7 9
EMAD = 2.291 16 1
EMAD = 1.579 16 2
EMAD = 1.401 16 3
EMAD = 1.369 16 4
EMAD = 1.407 16 5
EMAD = 1.228 16 6
EMAD = 1.350 16 7
EMAD = 1.363 16 8
EMAD = 1.722 16 9
EMAD = 4.190 17 1
EMAD = 1.928 17 2
EMAD = 1.669 17 3
EMAD = 1.505 17 4
EMAD = 2.171 17 5
EMAD = 1.127 17 6
EMAD = 2.802 17 7
EMAD = 2.700 17 8
EMAD = 2.373 17 9
EMAD = 2.852 18 1
EMAL = 2.503 18 2
EMAD = 2.275 18 3
EMAD = 2.405 18 4
EMAD = 2.482 18 5
EMAL = 2.462 18 6

```
EMAD =      2.500   18   7
EMAD =      2.384   18   8
EMAD =      2.474   18   9
EMAD =      2.912   19   1
EMAD =      2.592   19   2
EMAD =      2.783   19   3
EMAD =      2.502   19   4
EMAD =      2.573   19   5
EMAD =      2.561   19   6
EMAD =      2.589   19   7
EMAD =      2.483   19   8
EMAD =      2.565   19   9
EMAD =      2.639   20   1
EMAD =      2.640   20   2
EMAD =      2.709   20   3
EMAD =      2.583   20   4
EMAD =      2.625   20   5
EMAD =      2.620   20   6
EMAD =      2.635   20   7
EMAD =      2.571   20   8
EMAD =      2.623   20   9
```

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                                VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1977      TEMP: 72.0(F)          .880/  .050/  .030/  .020/  .020/  .000
REGION: 49-STATE     12.5/12.5/12.5 MPH ( 5.0)          20.0/   5.0/  20.0

                     COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
  TOTAL HC:    9.12     10.22    14.01    48.17     5.36    15.70     10.04
  *EVAP HC:    2.02      2.22     3.10     2.92      .00     1.94      ----
EXHAUST  CO:  90.18     96.23   120.21   424.90    46.00    51.93     97.19
EXHAUST NOX:   2.77      2.77     4.57    10.06    24.73      .12      3.37

                     CORRECTED IDLE EMISSION FACTORS (GM/MIN)
  IDLE  HC:    2.05      2.46     4.36     4.05      .44     4.94      2.15
  IDLE  CO:   29.93     31.02    44.09    42.93      .93    10.55     30.09
  IDLE NOX:     .34       .28      .28      .03     1.04      .01       .34
-----------------------------------------------------------------------------
                                VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1977      TEMP: 75.0(F)          1.000/  .000/  .000/  .000/  .000/  .000
REGION: 49-STATE     12.5/12.5/12.5 MPH ( 5.0)           .0/    .0/    .0

                     COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
  TOTAL HC:    7.70      8.68    11.90    48.17     5.86    13.76      7.70
  *EVAP HC:    2.02      2.22     3.10     2.92      .00     1.94      ----
EXHAUST  CO:  73.13     78.42    98.59   424.90    46.00    44.13     73.13
EXHAUST NOX:   2.46      2.50     4.20    10.06    24.73      .11      2.46

                     CORRECTED IDLE EMISSION FACTORS (GM/MIN)
  IDLE  HC:    1.66      1.94     3.52     4.05      .44     4.25      1.66
  IDLE  CO:   25.17     26.29    37.67    42.93      .93     8.96     25.17
  IDLE NOX:     .28       .24      .24      .03     1.04      .01       .28
-----------------------------------------------------------------------------
DECELERATION EMISSIONS FOR INTERSECTION    1 PHASE    1 APPROACH    2 =      .3486+01 GM/VEHICLE
   X(I) =     4.00    20.00    10.00    50.00   133.33    25.00   125.00   333.33   833.33     4.00    20.00   133.33
   SOA =   1.0          HOA =    .0
      EMAD =          .219     2     1
```

EMAD = .177 2 2
EMAD = .215 2 3
EMAD = .236 2 4
EMAD = .241 2 5
EMAD = .138 2 6
EMAD = .206 2 7
EMAD = .204 2 8
EMAD = .200 2 9
EMAD = .216 4 1
EMAD = .298 4 2
EMAD = .334 4 3
EMAD = .331 4 4
EMAD = .333 4 5
EMAD = .323 4 6
EMAD = .330 4 7
EMAD = .332 4 8
EMAD = .334 4 9
EMAD = .504 5 1
EMAD = .474 5 2
EMAD = .524 5 3
EMAD = .517 5 4
EMAD = .519 5 5
EMAD = .493 5 6
EMAD = .505 5 7
EMAD = .507 5 8
EMAD = .508 5 9
EMAD = .694 6 1
EMAD = .663 6 2
EMAD = .731 6 3
EMAD = .720 6 4
EMAD = .722 6 5
EMAD = .709 6 6
EMAD = .713 6 7
EMAD = .716 6 8
EMAD = .720 6 9
EMAD = .951 7 1
EMAD = .906 7 2
EMAD = 1.014 7 3
EMAD = .988 7 4
EMAD = .992 7 5
EMAD = 1.001 7 6
EMAD = 1.001 7 7
EMAD = 1.005 7 8
EMAD = 1.016 7 9
EMAD = 1.246 16 1
EMAD = 1.242 16 2
EMAD = 1.273 16 3
EMAD = 1.294 16 4
EMAD = 1.206 16 5
EMAD = 1.117 16 6
EMAD = 1.241 16 7
EMAD = 1.240 16 8
EMAD = 1.229 16 9
EMAD = 2.019 17 1
EMAD = 1.729 17 2
EMAD = 1.433 17 3
EMAD = 1.459 17 4

```
 EMAD =    1.994   17    5
 EMAD =    1.972   17    6
 EMAD =    1.707   17    7
 EMAD =    1.713   17    8
 EMAD =    1.687   17    9
 EMAD =    1.640   18    1
 EMAD =    1.796   18    2
 EMAD =    1.887   18    3
 EMAD =    1.866   18    4
 EMAD =    1.770   18    5
 EMAD =    1.863   18    6
 EMAD =    1.869   18    7
 EMAD =    1.877   18    8
 EMAD =    1.884   18    9
 EMAD =    2.024   19    1
 EMAD =    1.983   19    2
 EMAD =    2.067   19    3
 EMAD =    2.043   19    4
 EMAD =    2.052   19    5
 EMAD =    2.045   19    6
 EMAD =    2.051   19    7
 EMAD =    2.058   19    8
 EMAD =    2.064   19    9
 EMAD =    2.152   20    1
 EMAD =    2.126   20    2
 EMAD =    2.179   20    3
 EMAD =    2.167   20    4
 EMAD =    2.169   20    5
 EMAD =    2.165   20    6
 EMAD =    2.169   20    7
 EMAD =    2.173   20    8
 EMAD =    2.177   20    9
                        VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
 CAL. YEAR: 1977      TEMP: 72.0(F)          .980/ .050/ .030/ .020/ .020/ .000
 REGION: 49-STATE      5.0/ 5.0/ 5.0 MPH ( 5.0)          20.0/  5.0/ 20.0

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV     LDT1     LDT2      HDG      HDD       MC      ALL MODES
  TOTAL HC:    18.70    20.97    28.37    94.99     8.19     33.72       20.42
  *EVAP HC:     2.02     2.22     3.10     2.92      .00      1.94        ----
 EXHAUST  CO: 224.81   237.75   304.29   762.76    76.55   120.68      235.63
 EXHAUST NOX:   2.96     3.02     5.27     9.37    72.37      .15        3.73

                      CORRECTED IDLE EMISSION FACTORS (GM/MIN)
  IDLE  HC:    2.05     2.40     4.36     4.05      .44     4.94        2.19
  IDLE  CO:   29.97    31.02    44.69    42.99      .93    10.55       30.09
  IDLE NOX:     .34      .26      .28      .03     1.04      .01         .34
-------------------------------------------------------------------------------
                        VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
 CAL. YEAR: 1977      TEMP: 75.0(F)         1.000/ .000/ .000/ .000/ .000/ .000
 REGION: 49-STATE      5.0/ 5.0/ 5.0 MPH ( 5.0)          .0/    .0/   .0

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV     LDT1     LDT2      HDG      HDD       MC      ALL MODES
  TOTAL HC:    19.49    17.47    23.50    94.99     8.19     29.24       15.49
  *EVAP HC:     2.02     2.22     3.10     2.92      .00      1.94        ----
 EXHAUST  CO: 198.82   190.72   240.11   762.76    76.55   102.56      188.82
```

EXHAUST NOX:	2.50	2.56	4.67	9.37	32.37	.14	2.50

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.64	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.29	.24	.24	.03	1.04	.01	.28

ACCELERATION EMISSIONS FOR INTERSECTION 1 PHASE 1 APPROACH Z = .2717+01 GM/VEHICLE

CAL. YEAR: 1977 TEMP: 72.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 25.0/25.0/25.0 MPH (5.0) .880/ .050/ .030/ .020/ .020/ .000
20.0/ 5.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	6.11	6.55	9.60	22.01	3.77	10.07	6.53
+EVAP HC:	2.02	2.26	3.10	2.92	.00	1.94	----
EXHAUST CO:	49.58	53.42	65.55	211.97	24.05	30.57	52.99
EXHAUST NOX:	3.17	3.21	5.47	11.21	19.18	.13	3.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	2.09	2.46	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.99	31.02	44.09	42.93	.93	10.55	30.09
IDLE NOX:	.34	.28	.28	.03	1.04	.01	.34

CAL. YEAR: 1977 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 25.0/25.0/25.0 MPH (5.0) 1.000/ .000/ .000/ .000/ .000/ .000
.0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.26	5.91	8.36	22.01	3.77	8.93	5.26
+EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	38.71	42.16	51.56	211.97	24.05	25.98	38.71
EXHAUST NOX:	2.93	2.96	5.18	11.21	19.18	.12	2.93

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.64	1.64	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.29	.24	.24	.03	1.04	.01	.28

CRUISE EMISSIONS FOR INTERSECTION 1 PHASE 1 APPROACH Z = .2506+00 GM/VEHICLE/SEC

X(I) = 10.00 -100.00 -20.00 200.00 1333.33 40.00 -400.00-2666.67 5333.33 10.00 -100.00 1333.33

SCA = 1.0 HOA = .0

EMAD =	.548	2	1
EMAD =	.737	2	2
EMAD =	.261	2	3
EMAD =	.176	2	4
EMAD =	.227	2	5
EMAD =	.062	2	6
EMAD =	.274	2	7
EMAD =	.271	2	8
EMAD =	.240	2	9
EMAD =	.530	4	1
EMAD =	.665	4	2
EMAD =	.373	4	3
EMAD =	.285	4	4
EMAD =	.402	4	5

```
 EMAD =      .386    4    6
 EMAD =      .409    4    7
 EMAD =      .393    4    8
 EMAD =      .404    4    9
 EMAE =      .529    5    1
 EMAD =      .680    5    2
 EMAD =      .579    5    3
 EMAD =      .510    5    4
 EMAE =      .536    5    5
 EMAD =      .594    5    6
 EMAD =      .533    5    7
 EMAD =      .516    5    8
 EMAD =      .622    5    9
 EMAD =     1.086    6    1
 EMAD =      .831    6    2
 EMAD =      .794    6    3
 EMAE =      .541    6    4
 EMAD =      .566    6    5
 EMAD =      .545    6    6
 EMAD =      .555    6    7
 EMAD =      .529    6    8
 EMAD =      .553    6    9
 EMAD =     1.431    7    1
 EMAD =     1.209    7    2
 EMAD =      .996    7    3
 EMAD =     1.097    7    4
 EMAD =     1.136    7    5
 EMAD =     1.150    7    6
 EMAE =     1.151    7    7
 EMAD =     1.094    7    8
 EMAD =     1.140    7    9
 EMAD =     1.966   16    1
 EMAD =     1.447   16    2
 EMAE =     1.285   16    3
 EMAD =     1.300   16    4
 EMAD =     1.422   16    5
 EMAD =     1.119   16    6
 EMAE =     1.517   16    7
 EMAD =     1.524   16    8
 EMAD =     1.451   16    9
 EMAD =     3.426   17    1
 EMAD =     1.978   17    2
 EMAD =     1.771   17    3
 EMAE =     1.666   17    4
 EMAE =     2.007   17    5
 EMAE =     1.172   17    6
 EMAD =     2.244   17    7
 EMAD =     2.192   17    8
 EMAD =     2.024   17    9
 EMAE =     2.407   18    1
 EMAD =     2.184   18    2
 EMAE =     2.101   18    3
 EMAE =     2.084   18    4
 EMAD =     2.124   18    5
 EMAD =     2.113   18    6
 EMAD =     2.132   18    7
 EMAE =     2.074   18    8
```

```
        EMAD =      2.120   18    5
        EMAD =      2.470   19    1
        EMAD =      2.266   19    2
        EMAD =      2.099   19    3
        EMAD =      2.175   19    4
        EMAD =      2.211   19    5
        EMAD =      2.201   19    6
        EMAD =      2.219   19    7
        EMAD =      2.165   19    8
        EMAD =      2.207   19    9
        EMAD =      2.426   20    1
        EMAD =      2.295   20    2
        EMAD =      2.194   20    3
        EMAD =      2.241   20    4
        EMAD =      2.264   20    5
        EMAD =      2.258   20    6
        EMAD =      2.269   20    7
        EMAD =      2.235   20    8
        EMAD =      2.262   20    9
                                VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1977       TEMP: 72.0(F)          .850/ .050/ .030/ .020/ .020/ .000
 REGION: 49-STATE      10.0/10.0/10.0 MPH ( 5.0)          20.0/  5.0/ 20.0

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                  LDV     LDT1    LDT2     HDG      HDD      MC      ALL MODES
    TOTAL HC:   10.74    12.04   16.45   59.23     6.51    15.80      11.86
    *EVAP HC:    2.02     2.22    3.10    2.92      .00     1.94       ----
 EXHAUST  CO:  112.37   119.62  150.72  509.02    53.96    63.65     120.65
 EXHAUST NOX:    2.77     2.78    4.62    9.53    26.79      .13       3.41

                        CORRECTED IDLE EMISSION FACTORS (GM/MIN)
    IDLE  HC:    2.05     2.41    4.36    4.05      .44     4.94       2.15
    IDLE  CO:   29.93    31.02   44.09   42.93      .93    10.55      30.09
    IDLE NOX:     .34      .28     .28     .03     1.04      .01        .34
-------------------------------------------------------------------------------
                                VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1977       TEMP: 75.0(F)         1.000/ .000/ .000/ .000/ .000/ .000
 REGION: 49-STATE      10.0/10.0/10.0 MPH ( 5.0)           .0/   .0/   .0

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                  LDV     LDT1    LDT2     HDG      HDD      MC      ALL MODES
    TOTAL HC:    9.01    10.16   13.65   59.23     6.51    16.42       9.01
    *EVAP HC:    2.02     2.22    3.10    2.92      .00     1.94       ----
 EXHAUST  CO:   91.91    98.18  125.05  509.02    53.96    54.09      91.91
 EXHAUST NOX:    2.43     2.44    4.20    9.83    26.79      .12       2.43

                        CORRECTED IDLE EMISSION FACTORS (GM/MIN)
    IDLE  HC:    1.66     1.94    3.52    4.05      .44     4.25       1.66
    IDLE  CO:   25.17    26.29   37.67   42.93      .93     8.96      25.17
    IDLE NOX:     .28      .24     .24     .03     1.04      .01        .28
-------------------------------------------------------------------------------
DECELERATION EMISSIONS FOR INTERSECTION    1 PHASE    2 APPROACH    1 =       .2969+01 GM/VEHICLE
    X(I) =    5.00   25.00   10.00   50.00  166.67   20.00  100.00  333.33  666.67    5.00   25.00  166.67
    SOA =   1.0          MOA =   .0
        EMAD =      .274   2    1
        EMAD =      .221   2    2
        EMAD =      .254   2    3
```

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EMAC =	.280	2	4
EMAC =	.287	2	5
EMAC =	.304	2	6
EMAD =	.257	2	7
EMAD =	.257	2	8
EMAD =	.253	2	9
EMAC =	.396	4	1
EMAD =	.377	4	2
EMAC =	.413	4	3
EMAC =	.410	4	4
EMAD =	.412	4	5
EMAD =	.404	4	6
EMAC =	.410	4	7
EMAC =	.412	4	8
EMAD =	.413	4	9
EMAC =	.625	5	1
EMAD =	.588	5	2
EMAC =	.639	5	3
EMAC =	.631	5	4
EMAD =	.634	5	5
EMAD =	.613	5	6
EMAD =	.623	5	7
EMAC =	.625	5	8
EMAC =	.626	5	9
EMAD =	.857	6	1
EMAC =	.819	6	2
EMAD =	.887	6	3
EMAC =	.876	6	4
EMAD =	.879	6	5
EMAC =	.869	6	6
EMAD =	.871	6	7
EMAD =	.875	6	8
EMAC =	.878	6	9
EMAD =	1.166	7	1
EMAD =	1.111	7	2
EMAC =	1.218	7	3
EMAC =	1.192	7	4
EMAC =	1.197	7	5
EMAD =	1.204	7	6
EMAD =	1.205	7	7
EMAC =	1.212	7	8
EMAC =	1.218	7	9
EMAD =	1.631	16	1
EMAC =	1.501	16	2
EMAC =	1.532	16	3
EMAC =	1.553	16	4
EMAD =	1.568	16	5
EMAD =	1.417	16	6
EMAD =	1.516	16	7
EMAC =	1.515	16	8
EMAD =	1.506	16	9
EMAD =	2.494	17	1
EMAD =	2.132	17	2
EMAD =	2.235	17	3
EMAD =	2.262	17	4
EMAC =	2.304	17	5
EMAC =	1.787	17	6

EMAD =	2.155	17	7
EMAD =	2.161	17	8
EMAD =	2.140	17	9
EMAD =	2.332	18	1
EMAD =	2.276	18	2
EMAD =	2.367	18	3
EMAD =	2.347	18	4
EMAD =	2.352	18	5
EMAD =	2.346	18	6
EMAD =	2.351	18	7
EMAD =	2.358	18	8
EMAD =	2.364	18	9
EMAD =	2.539	19	1
EMAD =	2.488	19	2
EMAD =	2.572	19	3
EMAD =	2.553	19	4
EMAD =	2.557	19	5
EMAD =	2.552	19	6
EMAD =	2.557	19	7
EMAD =	2.564	19	8
EMAD =	2.569	19	9
EMAD =	2.679	20	1
EMAD =	2.647	20	2
EMAD =	2.699	20	3
EMAD =	2.687	20	4
EMAD =	2.690	20	5
EMAD =	2.687	20	6
EMAD =	2.690	20	7
EMAD =	2.694	20	8
EMAD =	2.697	20	9

CAL. YEAR: 1977 TEMP: 72.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 5.0/ 5.0/ 5.0 MPH (5.0) .880/ .050/ .030/ .020/ .020/ .000
20.0/ 5.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	18.70	20.97	28.37	94.99	8.19	33.72	20.42
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	224.81	237.75	304.29	762.76	76.55	120.68	235.63
EXHAUST NOX:	2.94	3.02	5.23	9.37	32.37	.15	3.73

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	2.05	2.40	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.93	31.02	44.09	42.93	.93	10.55	30.09
IDLE NOX:	.34	.28	.28	.03	1.04	.01	.34

CAL. YEAR: 1977 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 5.0/ 5.0/ 5.0 MPH (5.0) 1.000/ .000/ .000/ .000/ .000/ .000
.0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.50	94.99	8.19	29.24	15.49
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	188.82	199.72	260.11	762.76	76.55	102.56	188.82
EXHAUST NOX:	2.50	2.58	4.65	9.37	32.37	.14	2.50

```
                    CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:   1.66     1.94      3.52      4.05      .44      4.25      1.66
   IDLE  CO:  25.17    26.29     37.67     42.93      .93      8.96     25.17
   IDLE NOX:   .28      .24       .24       .03     1.04       .01       .28
-------------------------------------------------------------------------------
ACCELERATION EMISSIONS FOR INTERSECTION    1 PHASE    2 APPROACH    1 =       .3366+01 GM/VEHICLE
                              VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1977      TEMP: 72.0(F)        .880/ .050/ .030/ .020/ .020/ .000
 REGION: 49-STATE     20.0/20.0/20.0 MPH ( 5.0)          20.0/  5.0/ 20.0

                    COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV     LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:    6.87     7.69     10.69     28.76      4.42     11.44      7.42
   *EVAP HC:    2.02     2.22      3.10      2.92       .00      1.94      ----
EXHAUST  CO:   59.83    64.23     78.85    268.72     30.27     35.83     64.21
EXHAUST NOX:    2.99     2.99      4.99     10.75     20.62       .13      3.52

                    CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:   2.05     2.40      4.36      4.05      .44      4.94      2.15
   IDLE  CO:  29.93    31.92     44.05     42.93      .93     10.55     30.09
   IDLE NOX:   .34      .28       .28       .03     1.04       .01       .34
-------------------------------------------------------------------------------
                              VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1977      TEMP: 75.0(F)       1.000/ .000/ .000/ .000/ .000/ .000
 REGION: 49-STATE     20.0/20.0/20.0 MPH ( 5.0)          .0/   .0/   .0

                    COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV     LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:    5.88     6.46      9.24     28.76      4.42     10.10      5.88
   *EVAP HC:    2.02     2.22      3.10      2.92       .00      1.94      ----
EXHAUST  CO:   47.46    51.42     62.98    268.72     30.27     30.45     47.49
EXHAUST NOX:    2.72     2.72      4.69     10.75     20.62       .12      2.72

                    CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:   1.66     1.94      3.52      4.05      .44      4.25      1.66
   IDLE  CO:  25.17    26.29     37.67     42.93      .93      8.96     25.17
   IDLE NOX:   .28      .24       .24       .03     1.04       .01       .28
-------------------------------------------------------------------------------
CRUISE EMISSIONS FOR INTERSECTION    1 PHASE    2 APPROACH    1 =       .2601+00 GM/VEHICLE/SEC
   X(I) =   10.00 -100.00  -20.00  220.00 1333.33   40.00 -400.00-2666.67 5333.33   10.00 -100.00 1333.33
   SOA =   1.0          HOA =   .0
        EMAD =          .548     2     1
        EMAD =          .337     2     2
        EMAD =          .261     2     3
        EMAD =          .176     2     4
        EMAD =          .227     2     5
        EMAD =          .062     2     6
        EMAD =          .274     2     7
        EMAD =          .271     2     8
        EMAD =          .240     2     9
        EMAD =          .530     4     1
        EMAD =          .645     4     2
        EMAD =          .373     4     3
        EMAD =          .385     4     4
        EMAD =          .402     4     5
        EMAD =          .306     4     6
        EMAD =          .409     4     7
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EMAD = .393 4 5
EMAD = .404 4 6
EMAD = .529 5 1
EMAD = .680 5 2
EMAD = .579 5 3
EMAD = .610 5 4
EMAD = .636 5 5
EMAD = .594 5 6
EMAD = .633 5 7
EMAD = .616 5 8
EMAD = .622 5 9
EMAD = 1.086 6 1
EMAD = .931 6 2
EMAD = .794 6 3
EMAD = .841 6 4
EMAD = .866 6 5
EMAD = .745 6 6
EMAD = .855 6 7
EMAD = .829 6 8
EMAD = .853 6 9
EMAD = 1.431 7 1
EMAD = 1.209 7 2
EMAD = .994 7 3
EMAD = 1.097 7 4
EMAD = 1.136 7 5
EMAD = 1.150 7 6
EMAD = 1.151 7 7
EMAD = 1.094 7 8
EMAD = 1.140 7 9
EMAD = 1.966 16 1
EMAD = 1.447 16 2
EMAD = 1.385 16 3
EMAD = 1.300 16 4
EMAD = 1.422 16 5
EMAD = 1.119 16 6
EMAD = 1.517 16 7
EMAD = 1.524 16 8
EMAD = 1.451 16 9
EMAD = 2.426 17 1
EMAD = 1.978 17 2
EMAD = 1.771 17 3
EMAD = 1.666 17 4
EMAD = 2.007 17 5
EMAD = 1.172 17 6
EMAD = 2.244 17 7
EMAD = 2.192 17 8
EMAD = 2.024 17 9
EMAD = 2.407 18 1
EMAD = 2.184 18 2
EMAD = 2.201 18 3
EMAD = 2.084 18 4
EMAD = 2.124 18 5
EMAD = 2.113 18 6
EMAD = 2.133 18 7
EMAD = 2.074 18 8
EMAD = 2.120 18 9
EMAD = 2.470 19 1

```
EMAD =      2.266   19   2
EMAD =      2.299   19   3
EMAD =      2.175   19   4
EMAD =      2.211   19   5
EMAD =      2.201   19   6
EMAD =      2.219   19   7
EMAD =      2.165   19   8
EMAD =      2.207   19   9
EMAD =      2.426   20   1
EMAD =      2.298   20   2
EMAD =      2.194   20   3
EMAD =      2.241   20   4
EMAD =      2.264   20   5
EMAD =      2.258   20   6
EMAD =      2.269   20   7
EMAD =      2.235   20   8
EMAD =      2.262   20   9
```

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```
                                VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC.
CAL. YEAR: 1977      TEMP: 72.0(F)          .850/  .050/  .030/  .020/  .020/  .000
REGION: 49-STATE     10.0/10.0/10.0 MPH ( 5.0)          20.0/   5.0/  20.0

                     COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
  TOTAL HC:   10.74    12.04    16.45    59.23     6.51    18.80      11.86
  *EVAP HC:    2.02     2.22     3.10     2.92      .00     1.94       ----
EXHAUST  CO:  112.37   119.62   150.72   509.02    53.96    63.65     120.65
EXHAUST NOX:    2.73     2.78     4.62     9.83    26.79      .13       3.41

                     CORRECTED IDLE EMISSION FACTORS (GM/MIN)
  IDLE  HC:    2.05     2.40     4.36     4.05      .44     4.94       2.15
  IDLE  CO:   29.93    31.02    44.09    42.93      .93    10.55      30.09
  IDLE NOX:     .34      .28      .28      .03     1.04      .01        .34
-----------------------------------------------------------------------------
                                VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1977      TEMP: 75.0(F)          1.000/  .000/  .000/  .000/  .000/  .000
REGION: 49-STATE     10.0/10.0/10.0 MPH ( 5.0)            .0/    .0/    .0

                     COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
  TOTAL HC:    9.01    10.16    13.65    59.23     6.51    16.42       9.01
  *EVAP HC:    2.02     2.22     3.10     2.92      .00     1.94       ----
EXHAUST  CO:   91.91    98.18   125.05   509.02    53.96    54.09      91.91
EXHAUST NOX:    2.43     2.48     4.20     9.83    26.79      .12       2.43

                     CORRECTED IDLE EMISSION FACTORS (GM/MIN)
  IDLE  HC:    1.66     1.94     3.52     4.05      .44     4.25       1.66
  IDLE  CO:   25.17    26.29    37.67    42.93      .93     8.96      25.17
  IDLE NOX:     .28      .24      .24      .03     1.04      .01        .28
-----------------------------------------------------------------------------
DECELERATION EMISSIONS FOR INTERSECTION    1 PHASE    2 APPROACH    2 =      .2969+01 GM/VEHICLE
   X(I) =    5.00   25.00   10.00   50.00  166.67   20.00  100.00  333.33  666.67    5.00   25.00  166.67
   SOA =   1.0          HOA =   .0
        EMAD =        .274    2    1
        EMAD =        .221    2    2
        EMAD =        .259    2    3
        EMAD =        .280    2    4
        EMAD =        .287    2    5
```

EMAD = .204 2 6
EMAD = .257 2 7
EMAD = .257 2 8
EMAD = .253 2 9
EMAD = .398 4 1
EMAD = .377 4 2
EMAD = .413 4 3
EMAD = .410 4 4
EMAD = .412 4 5
EMAD = .404 4 6
EMAD = .410 4 7
EMAD = .412 4 8
EMAD = .413 4 9
EMAD = .625 5 1
EMAD = .588 5 2
EMAD = .636 5 3
EMAD = .631 5 4
EMAD = .634 5 5
EMAD = .613 5 6
EMAD = .623 5 7
EMAD = .625 5 8
EMAD = .626 5 9
EMAD = .857 6 1
EMAD = .819 6 2
EMAD = .887 6 3
EMAD = .876 6 4
EMAD = .879 6 5
EMAD = .869 6 6
EMAD = .871 6 7
EMAD = .875 6 8
EMAD = .878 6 9
EMAD = 1.166 7 1
EMAD = 1.111 7 2
EMAD = 1.213 7 3
EMAD = 1.192 7 4
EMAD = 1.197 7 5
EMAD = 1.204 7 6
EMAD = 1.205 7 7
EMAD = 1.212 7 8
EMAD = 1.218 7 9
EMAD = 1.631 16 1
EMAD = 1.501 16 2
EMAD = 1.532 16 3
EMAD = 1.553 16 4
EMAD = 1.568 16 5
EMAD = 1.417 16 6
EMAD = 1.516 16 7
EMAD = 1.515 16 8
EMAD = 1.506 16 9
EMAD = 2.494 17 1
EMAD = 2.132 17 2
EMAD = 2.235 17 3
EMAD = 2.262 17 4
EMAD = 2.304 17 5
EMAD = 1.987 17 6
EMAD = 2.155 17 7
EMAD = 2.161 17 8

EMAD =	2.140	17	9
EMAD =	2.332	18	1
EMAD =	2.276	18	2
EMAD =	2.367	18	3
EMAD =	2.347	18	4
EMAD =	2.352	18	5
EMAD =	2.346	18	6
EMAD =	2.351	18	7
EMAD =	2.358	18	8
EMAD =	2.364	18	9
EMAD =	2.539	19	1
EMAD =	2.488	19	2
EMAD =	2.572	19	3
EMAD =	2.553	19	4
EMAD =	2.557	19	5
EMAD =	2.552	19	6
EMAD =	2.557	19	7
EMAD =	2.564	19	8
EMAD =	2.569	19	9
EMAD =	2.679	20	1
EMAD =	2.647	20	2
EMAD =	2.699	20	3
EMAD =	2.687	20	4
EMAD =	2.690	20	5
EMAD =	2.687	20	6
EMAD =	2.690	20	7
EMAD =	2.694	20	8
EMAD =	2.697	20	9

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CAL. YEAR: 1977 TEMP: 72.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 5.0/ 5.0/ 5.0 MPH (5.0) .880/ .050/ .030/ .020/ .020/ .000
20.0/ 5.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	18.70	20.97	28.37	94.99	8.19	33.72	20.42
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	224.81	237.75	304.29	762.76	76.55	120.68	235.63
EXHAUST NOX:	2.94	3.02	5.23	9.37	32.37	.15	3.73

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	2.05	2.40	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.93	31.02	44.09	42.93	.93	10.55	30.09
IDLE NOX:	.34	.28	.28	.03	1.04	.01	.34

CAL. YEAR: 1977 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 5.0/ 5.0/ 5.0 MPH (5.0) 1.000/ .000/ .000/ .000/ .000/ .000
.0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.50	94.99	8.19	29.24	15.49
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	188.82	199.72	260.11	762.76	76.55	102.56	188.82
EXHAUST NOX:	2.50	2.55	4.65	9.37	32.37	.14	2.50

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66

IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

ACCELERATION EMISSIONS FOR INTERSECTION 1 PHASE 2 APPROACH 2 = .3366+01 GM/VEHICLE

CAL. YEAR: 1977 VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE TEMP: 72.0(F) .880/ .050/ .030/ .020/ .020/ .000
20.0/20.0/20.0 MPH (5.0) 20.0/ 5.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	6.87	7.69	10.69	28.76	4.42	11.44	7.42
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	59.83	64.23	78.88	268.72	30.27	35.83	64.21
EXHAUST NOX:	2.99	2.99	4.99	10.75	20.62	.13	3.52

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	2.09	2.40	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.93	31.02	44.09	42.93	.93	10.55	30.09.
IDLE NOX:	.34	.28	.28	.03	1.04	.01	.34

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE 20.0/20.0/20.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.69	6.62	9.24	28.76	4.42	10.10	5.88
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.98	268.72	30.27	30.45	47.49
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	2.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

CRUISE EMISSIONS FOR INTERSECTION 1 PHASE 2 APPROACH 2 = .2601+00 GM/VEHICLE/SEC

CAL. YEAR: 1977 VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE TEMP: 72.0(F) .880/ .050/ .030/ .020/ .020/ .000
20.0/20.0/20.0 MPH (5.0) 20.0/ 5.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	6.87	7.69	10.69	28.76	4.42	11.44	7.42
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	59.83	64.23	78.88	268.72	30.27	35.83	64.21
EXHAUST NOX:	2.99	2.99	4.99	10.75	20.62	.13	3.52

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	2.09	2.40	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.93	31.02	44.09	42.93	.93	10.55	30.09
IDLE NOX:	.34	.28	.28	.03	1.04	.01	.34

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977 TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE 20.0/20.0/20.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	5.88
+EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.98	260.72	30.27	30.45	47.49
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	2.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	28.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

FOR LINK 5 (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE= .2601+00 GM/VEHICLE/SEC

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 72.0(F) .820/ .050/ .030/ .020/ .020/ .000
REGION: 49-STATE 25.0/25.0/25.0 MPH (5.0) 20.0/ 5.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	6.11	6.85	9.60	22.01	3.77	10.07	6.53
+EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	49.59	53.42	65.55	211.97	24.05	30.57	52.99
EXHAUST NOX:	3.17	3.21	5.47	11.21	19.18	.13	3.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	2.05	2.49	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.93	31.02	44.09	42.93	.93	10.55	30.09
IDLE NOX:	.34	.28	.29	.03	1.04	.01	.34

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE 25.0/25.0/25.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.26	5.91	8.26	22.01	3.77	8.93	5.26
+EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	38.71	42.16	51.56	211.97	24.05	25.98	38.71
EXHAUST NOX:	2.93	2.96	5.15	11.21	19.18	.12	2.93

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	28.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

FOR LINK 6 (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE= .2506+00 GM/VEHICLE/SEC

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 72.0(F) .820/ .050/ .030/ .020/ .020/ .000
REGION: 49-STATE 20.0/20.0/20.0 MPH (5.0) 20.0/ 5.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	6.87	7.69	10.69	28.76	4.42	11.44	7.42
+EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----

EXHAUST CO:	59.83	64.23	78.88	268.72	30.27	35.83	64.21
EXHAUST NOX:	2.95	2.99	4.99	10.75	20.62	.13	3.52

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	2.05	2.40	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.97	31.02	44.05	42.93	.93	10.55	30.09
IDLE NOX:	.34	.28	.28	.03	1.04	.01	.34

CAL. YEAR: 1977 REGION: 49-STATE

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
20.0/20.0/20.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	5.88
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.98	268.72	30.27	30.45	47.49
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	2.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

FOR LINK 7 (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE= .2601+00 GM/VEHICLE/SEC

CAL. YEAR: 1977 REGION: 49-STATE

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
TEMP: 72.0(F) .880/ .050/ .030/ .020/ .020/ .000
20.0/20.0/20.0 MPH (5.0) 20.0/ 5.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	6.87	7.69	10.69	28.76	4.42	11.44	7.42
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	59.83	64.23	78.88	268.72	30.27	35.83	64.21
EXHAUST NOX:	2.95	2.99	4.99	10.75	20.62	.13	3.52

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CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	2.05	2.40	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.97	31.02	44.05	42.93	.93	10.55	30.09
IDLE NOX:	.34	.28	.28	.03	1.04	.01	.34

CAL. YEAR: 1977 REGION: 49-STATE

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
20.0/20.0/20.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	5.88
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.98	268.72	30.27	30.45	47.49
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	2.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

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FOR LINK    (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE=        .2601+00 GM/VEHICLE/SEC
I=    1 J=    1 INS=    1 VOL=        .2500+03 CS=        .2100+04 ISIG=    1
CLENTH=        .2169+02 DELAY=        .1489+02 NPHASE=    2
GAP=        .0 LINK=    1 NGND=    0 CY=      34.19 G=       9.43
I=    2 J=    1 INS=    1 VOL=        .2000+03 CS=        .1800+04 ISIG=    1
CLENTH=        .1777+02 DELAY=        .1497+02 NPHASE=    2
GAP=        .0 LINK=    2 NGND=    0 CY=      34.19 G=       9.43
I=    1 J=    2 INS=    1 VOL=        .2500+03 CS=        .1200+04 ISIG=    1
CLENTH=        .1573+02 DELAY=        .7748+01 NPHASE=    2
GAP=        .0 LINK=    3 NGND=    0 CY=      34.19 G=      18.76
I=    2 J=    2 INS=    1 VOL=        .2500+03 CS=        .1200+04 ISIG=    1
CLENTH=        .1573+02 DELAY=        .7748+01 NPHASE=    2
GAP=        .0 LINK=    4 NGND=    0 CY=      34.19 G=      18.76


INTERSECTION=    1 PHASE=    1 APPROACH=    1 LINK=    1 LANE=    1
EMISSION RATE=        .1557-02 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    1 LINK(PSEUDOLINK)=    9 LANE=    1
EMISSION RATE=        .4032-01 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    1 LINK=    1 LANE=    2
EMISSION RATE=        .1557-02 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    1 LINK(PSEUDOLINK)=    9 LANE=    2
EMISSION RATE=        .4032-01 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    2 LINK=    2 LANE=    1
EMISSION RATE=        .1245-02 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    2 LINK(PSEUDOLINK)=   10 LANE=    1
EMISSION RATE=        .3103-01 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    2 LINK=    2 LANE=    2
EMISSION RATE=        .1245-02 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    2 LINK(PSEUDOLINK)=   10 LANE=    2
EMISSION RATE=        .3103-01 GM/METER/SEC
INTERSECTION=    1 PHASE=    2 APPROACH=    1 LINK=    3 LANE=    1
EMISSION RATE=        .2020-02 GM/METER/SEC
INTERSECTION=    1 PHASE=    2 APPROACH=    1 LINK(PSEUDOLINK)=   11 LANE=    1
EMISSION RATE=        .3318-01 GM/METER/SEC
INTERSECTION=    1 PHASE=    2 APPROACH=    2 LINK=    4 LANE=    1
EMISSION RATE=        .2020-02 GM/METER/SEC
INTERSECTION=    1 PHASE=    2 APPROACH=    2 LINK(PSEUDOLINK)=   12 LANE=    1
EMISSION RATE=        .3318-01 GM/METER/SEC


LINK(NOT APPROACHING INTERSECTION)=    5 LANE=    1 EMISSION RATE=        .1616-02 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)=    5 LANE=    2 EMISSION RATE=        .1616-02 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)=    6 LANE=    1 EMISSION RATE=        .1495-02 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)=    6 LANE=    2 EMISSION RATE=        .9964-03 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)=    7 LANE=    1 EMISSION RATE=        .2424-02 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)=    8 LANE=    1 EMISSION RATE=        .2424-02 GM/METER/SEC

          CONTRIBUTION FROM LINK  1

 RECEPTOR LOCATION        HEIGHT      CONCENTRATION
    X          Y            Z(M)      UGM/METER**3      PPM *
  1.4800     1.9700       1.0000            0.        .000
  1.5200     1.9600       1.0000            0.        .000
```

1.5200	1.9600	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 2

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	698.	.607
1.5200	1.9800	1.0000	87.	.076
1.5200	1.9800	4.0000	84.	.073
1.4700	2.0200	1.0000	601.	.523
1.4700	1.9800	1.0000	579.	.503

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 3

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	125.	.109
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	414.	.360

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 4

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	0.	.000
1.5200	1.9800	1.0000	179.	.156
1.5200	1.9800	4.0000	107.	.093
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 5

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	52.	.045
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK C

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	386.	.336
1.5200	1.9800	1.0000	387.	.336
1.5200	1.9800	4.0000	348.	.302
1.4700	2.0200	1.0000	258.	.225
1.4700	1.9800	1.0000	268.	.234

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK D

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	93.	.081
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	283.	.246

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK E

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	0.	.000
1.5200	1.9800	1.0000	295.	.257
1.5200	1.9800	4.0000	76.	.066
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK G

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	0.	.000
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 1C

RECEPTOR LOCATION	HEIGHT	CONCENTRATION

X	Y	Z(F)	UGM/METER**3	PPM *
1.4800	1.9700	1.0000	3284.	2.857
1.5200	1.9800	1.0000	6.	.005
1.5200	1.9800	4.0000	5.	.004
1.4700	2.0200	1.0000	38.	.033
1.4700	1.9800	1.0000	1262.	1.098

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 11

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	2046.	1.780
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	6416.	5.582

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 12

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	0.	.000
1.5200	1.9800	1.0000	2813.	2.447
1.5200	1.9800	4.0000	1682.	1.463
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

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CONCENTRATION FOR HOUR 1 AT RECEPTOR 1 = .5815+01 PPM
CONCENTRATION FOR HOUR 1 AT RECEPTOR 2 = .3277+01 PPM
CONCENTRATION FOR HOUR 1 AT RECEPTOR 3 = .2002+01 PPM
CONCENTRATION FOR HOUR 1 AT RECEPTOR 4 = .7803+00 PPM
CONCENTRATION FOR HOUR 1 AT RECEPTOR 5 = .8023+01 PPM

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: .0(F) .850/ .050/ .030/ .020/ .020/ .000
REGION: 49-STATE 5.0/ 5.0/ 5.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.50	94.99	5.19	29.24	17.27
EVAP HC:	2.02	2.22	3.15	2.92	.00	1.94	----
EXHAUST CO:	196.82	199.72	240.11	762.76	76.55	102.56	200.74

EXHAUST NOX: 2.50 2.54 4.05 9.37 32.37 .14 3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.64	1.64	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	9.96	25.47
IDLE NOX:	.29	.24	.24	.03	1.04	.01	.29

IDLING EMISSIONS= .4245+00 GM/VEHICLE/SEC

X(I) = 10.00 -125.00 -25.00 312.50 2083.33 62.50 -781.25-5208.3313020.83 10.00 -125.00 2083.33
SOA = 1.0 NOA = .0

EMAD =	.548	2	1
EMAD =	.284	2	2
EMAD =	.189	2	3
EMAD =	.056	2	4
EMAD =	.136	2	5
EMAD =	-.122	2	6
EMAD =	.292	2	7
EMAD =	.287	2	8
EMAD =	.212	2	9
EMAD =	.502	4	1
EMAD =	.395	4	2
EMAD =	.305	4	3
EMAD =	.324	4	4
EMAD =	.350	4	5
EMAD =	.326	4	6
EMAD =	.370	4	7
EMAD =	.338	4	8
EMAD =	.367	4	9
EMAD =	.791	5	1
EMAD =	.605	5	2
EMAD =	.479	5	3
EMAD =	.527	5	4
EMAD =	.567	5	5
EMAD =	.502	5	6
EMAD =	.578	5	7
EMAD =	.545	5	8
EMAD =	.561	5	9
EMAD =	1.024	6	1
EMAD =	.831	6	2
EMAD =	.660	6	3
EMAD =	.732	6	4
EMAD =	.771	6	5
EMAD =	.740	6	6
EMAD =	.759	6	7
EMAD =	.707	6	8
EMAD =	.768	6	9
EMAD =	1.245	7	1
EMAD =	1.067	7	2
EMAD =	.799	7	3
EMAD =	.960	7	4
EMAD =	1.020	7	5
EMAD =	1.043	7	6
EMAD =	1.045	7	7
EMAD =	.934	7	8
EMAD =	1.046	7	9
EMAD =	1.772	16	1

EMAD =	1.222	16	2
EMAD =	1.145	16	3
EMAD =	1.017	16	4
EMAD =	1.207	16	5
EMAD =	.730	16	6
EMAD =	1.507	16	7
EMAD =	1.520	16	8
EMAD =	1.344	16	9
EMAD =	3.318	17	1
EMAD =	1.509	17	2
EMAD =	1.250	17	3
EMAD =	1.085	17	4
EMAD =	1.618	17	5
EMAD =	.313	17	6
EMAD =	2.407	17	7
EMAD =	2.305	17	8
EMAD =	1.696	17	9
EMAD =	2.279	18	1
EMAD =	2.300	18	2
EMAD =	1.772	18	3
EMAD =	1.902	18	4
EMAD =	1.964	18	5
EMAD =	1.946	18	6
EMAD =	1.986	18	7
EMAD =	1.570	18	8
EMAD =	1.982	18	9
EMAD =	2.232	19	1
EMAD =	2.077	19	2
EMAD =	1.868	19	3
EMAD =	1.987	19	4
EMAD =	2.044	19	5
EMAD =	2.028	19	6
EMAD =	2.063	19	7
EMAD =	1.957	19	8
EMAD =	2.060	19	9
EMAD =	2.279	20	1
EMAD =	2.120	20	2
EMAD =	1.989	20	3
EMAD =	2.062	20	4
EMAD =	2.099	20	5
EMAD =	2.089	20	6
EMAD =	2.111	20	7
EMAD =	2.045	20	8
EMAD =	2.109	20	9

CAL. YEAR: 1977 VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE TEMP: .0(F) .880/ .050/ .030/ .020/ .020/ .000
12.5/12.5/12.5 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	7.70	9.66	11.60	48.17	5.66	13.76	8.65
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	73.13	79.42	98.59	424.90	46.00	44.13	80.65
EXHAUST NOX:	2.46	2.50	4.20	10.26	24.73	.11	3.12

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.64	1.94	3.52	4.05	.44	4.25	1.75

IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.28	.24	.44	.03	1.04	.01	.29

CAL. YEAR: 1977 VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
12.5/12.5/12.5 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	7.70	5.68	11.50	45.17	5.86	13.76	7.70
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	73.13	78.42	98.59	424.90	46.00	44.13	73.13
EXHAUST NOX:	2.46	2.50	4.20	10.06	24.73	.11	2.46

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.44	.03	1.04	.01	.28

DECELERATION EMISSIONS FOR INTERSECTION 1 PHASE 1 APPROACH 1 = .2326+01 GM/VEHICLE

X(I) = 12.50 156.25 25.00 312.50 2604.17 50.00 625.00 5208.33 104 16.67 12.50 156.25 2604.17

SCA = 1.0 HOA = .0

EMAD =	.685	2	1
EMAD =	.755	2	2
EMAD =	.449	2	3
EMAD =	.533	2	4
EMAD =	.683	2	5
EMAD =	.477	2	6
EMAD =	.508	2	7
EMAD =	.613	2	8
EMAD =	.753	2	9
EMAD =	1.115	4	1
EMAD =	.981	4	2
EMAD =	1.071	4	3
EMAD =	1.052	4	4
EMAD =	1.084	4	5
EMAD =	1.064	4	6
EMAD =	1.100	4	7
EMAD =	1.132	4	8
EMAD =	1.155	4	9
EMAD =	1.485	5	1
EMAD =	1.452	5	2
EMAD =	1.579	5	3
EMAD =	1.530	5	4
EMAD =	1.581	5	5
EMAD =	1.528	5	6
EMAD =	1.585	5	7
EMAD =	1.622	5	8
EMAD =	1.634	5	9
EMAD =	2.213	6	1
EMAD =	1.972	6	2
EMAD =	2.143	6	3
EMAD =	2.071	6	4
EMAD =	2.120	6	5
EMAD =	2.095	6	6
EMAD =	2.111	6	7
EMAD =	2.163	6	8

EMAD =	2.212	6	9
EMAD =	2.934	7	1
EMAD =	2.586	7	2
EMAD =	2.855	7	3
EMAD =	2.693	7	4
EMAD =	2.768	7	5
EMAD =	2.786	7	6
EMAD =	2.708	7	7
EMAD =	2.900	7	8
EMAD =	2.990	7	9
EMAD =	4.023	16	1
EMAD =	3.210	16	2
EMAD =	3.288	16	3
EMAD =	3.420	16	4
EMAD =	3.657	16	5
EMAD =	3.278	16	6
EMAD =	3.900	16	7
EMAD =	3.887	16	8
EMAD =	3.746	16	9
EMAD =	6.214	17	1
EMAD =	3.952	17	2
EMAD =	4.211	17	3
EMAD =	4.376	17	4
EMAD =	5.043	17	5
EMAD =	3.999	17	6
EMAD =	5.674	17	7
EMAD =	5.776	17	8
EMAD =	5.449	17	9
EMAD =	5.928	18	1
EMAD =	5.579	18	2
EMAD =	5.807	18	3
EMAD =	5.677	18	4
EMAD =	5.755	18	5
EMAD =	5.741	18	6
EMAD =	5.772	18	7
EMAD =	5.888	18	8
EMAD =	5.978	18	9
EMAD =	6.416	19	1
EMAD =	6.097	19	2
EMAD =	6.306	19	3
EMAD =	6.187	19	4
EMAD =	6.258	19	5
EMAD =	6.245	19	6
EMAD =	6.274	19	7
EMAD =	6.380	19	8
EMAD =	6.462	19	9
EMAD =	6.736	20	1
EMAD =	6.536	20	2
EMAD =	6.667	20	3
EMAD =	6.592	20	4
EMAD =	6.637	20	5
EMAD =	6.629	20	6
EMAD =	6.647	20	7
EMAD =	6.713	20	8
EMAD =	6.764	20	9

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP:	.0(F)	.880/	.050/	.030/	.020/	.020/	.000

REGION: 49-STATE 12.5/12.5/12.5 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	7.70	8.68	11.90	48.17	5.86	13.76	8.65
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	73.13	78.42	98.59	424.90	46.00	44.13	80.65
EXHAUST NOX:	2.46	2.50	4.20	10.06	24.73	.11	3.12

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.29

CAL. YEAR: 1977 VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
12.5/12.5/12.5 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	7.70	8.68	11.90	48.17	5.86	13.76	7.70
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	73.13	78.42	98.59	424.90	46.00	44.13	73.13
EXHAUST NOX:	2.46	2.50	4.20	10.06	24.73	.11	2.46

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

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*ACCELERATION EMISSIONS FOR INTERSECTION 1 PHASE 1 APPROACH 1 = .7460+01 GM/VEHICLE

CAL. YEAR: 1977 VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE TEMP: .0(F) .880/ .050/ .030/ .020/ .020/ .000
25.0/25.0/25.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.26	5.91	8.36	22.01	3.77	8.93	5.69
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	38.71	42.16	51.56	211.97	24.05	25.98	42.44
EXHAUST NOX:	2.93	2.96	5.15	11.21	19.15	.12	3.49

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.29

CAL. YEAR: 1977 VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
25.0/25.0/25.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.26	5.91	8.36	22.01	3.77	8.93	5.26
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	38.71	42.16	51.56	211.97	24.05	25.98	38.71
EXHAUST NOX:	2.93	2.96	5.15	11.21	19.15	.12	2.93

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.06	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.25	.24	.24	.03	1.04	.01	.28

CRUISE EMISSIONS FOR INTERSECTION 1 PHASE 1 APPROACH 1 = .2007+00 GM/VEHICLE/SEC

X(I) = 12.50 -156.25 -25.00 312.50 2604.17 50.00 -625.00-5208.3310416.67 12.50 -156.25 2604.17

SOA = 1.0 WOA = .0

EMAL =	.685	2	1
EMAD =	.355	2	2
EMAC =	.260	2	3
EMAD =	.127	2	4
EMAC =	.228	2	5
EMAD =	.021	2	6
EMAD =	.352	2	7
EMAC =	.347	2	8
EMAD =	.287	2	9
EMAD =	.645	4	1
EMAL =	.516	4	2
EMAD =	.426	4	3
EMAD =	.445	4	4
EMAD =	.479	4	5
EMAD =	.458	4	6
EMAD =	.493	4	7
EMAD =	.461	4	8
EMAD =	.484	4	9
EMAD =	1.015	5	1
EMAC =	.782	5	2
EMAL =	.656	5	3
EMAD =	.704	5	4
EMAC =	.755	5	5
EMAD =	.702	5	6
EMAD =	.763	5	7
EMAC =	.730	5	8
EMAD =	.743	5	9
EMAD =	1.322	6	1
EMAL =	1.081	6	2
EMAC =	.910	6	3
EMAD =	.982	6	4
EMAD =	1.031	6	5
EMAD =	1.006	6	6
EMAC =	1.021	6	7
EMAD =	.969	6	8
EMAL =	1.017	6	9
EMAL =	1.739	7	1
EMAD =	1.392	7	2
EMAD =	1.123	7	3
EMAD =	1.295	7	4
EMAC =	1.260	7	5
EMAD =	1.378	7	6
EMAD =	1.380	7	7
EMAD =	1.269	7	8
EMAL =	1.352	7	9
EMAL =	2.391	16	1
EMAD =	1.579	16	2
EMAL =	1.301	16	3
EMAD =	1.369	16	4

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 EMAD =    1.607   16   5
 EMAD =    1.225   16   6
 EMAD =    1.450   16   7
 EMAD =    1.362   16   8
 EMAD =    1.722   16   9
 EMAD =    4.190   17   1
 EMAD =    1.926   17   2
 EMAD =    1.669   17   3
 EMAD =    1.505   17   4
 EMAD =    2.171   17   5
 EMAD =    1.127   17   6
 EMAD =    2.502   17   7
 EMAD =    2.700   17   8
 EMAD =    2.373   17   9
 EMAD =    2.852   18   1
 EMAD =    2.502   18   2
 EMAD =    2.275   18   3
 EMAD =    2.405   18   4
 EMAD =    2.482   18   5
 EMAD =    2.468   18   6
 EMAD =    2.500   18   7
 EMAD =    2.384   18   8
 EMAD =    2.474   18   9
 EMAD =    2.912   19   1
 EMAD =    2.592   19   2
 EMAD =    2.382   19   3
 EMAD =    2.502   19   4
 EMAD =    2.573   19   5
 EMAD =    2.561   19   6
 EMAD =    2.589   19   7
 EMAD =    2.483   19   8
 EMAD =    2.565   19   9
 EMAD =    2.939   20   1
 EMAD =    2.640   20   2
 EMAD =    2.509   20   3
 EMAD =    2.582   20   4
 EMAD =    2.628   20   5
 EMAD =    2.620   20   6
 EMAD =    2.638   20   7
 EMAD =    2.571   20   8
 EMAD =    2.622   20   9

CAL. YEAR: 1977          VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC.
REGION: 49-STATE                     .880/  .050/  .030/  .020/  .020/  .000
TEMP:    .0(F)                                        .0/    .0/    .0
12.5/12.5/12.5 MPH ( 5.0)

                    COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2      HDG      HDD      MC      ALL MODES
  TOTAL HC:     7.70      8.68    11.90    48.17     5.86    13.76       8.65
 *EVAP HC:      2.02      2.22     3.10     2.92      .00     1.94       ----
EXHAUST  CO:   73.13     78.42    98.56   424.90    46.00    44.13      80.65
EXHAUST NOX:    2.44      2.50     4.20    10.06    24.73      .11       3.12

                    CORRECTED IDLE EMISSION FACTORS (GM/MIN)
  IDLE  HC:     1.66      1.94     3.52     4.05      .44     4.25       1.75
  IDLE  CO:    25.17     26.29    37.67    42.93     9.9     8.96      25.47
  IDLE NOX:     .28       .24      .24      .02     1.04      .01        .29
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CAL. YEAR: 1977
REGION: 49-STATE

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
12.5/12.5/12.5 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	7.70	8.66	11.50	48.17	5.86	13.76	7.70
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	73.13	78.62	98.59	424.99	46.00	44.13	73.13
EXHAUST NOX:	2.46	2.56	4.20	10.06	24.73	.11	2.46

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	28.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.29	.24	.24	.03	1.04	.01	.28

DECELERATION EMISSIONS FOR INTERSECTION 1 PHASE 1 APPROACH 2 = .2892+01 GM/VEHICLE
X(I) = 4.00 20.00 10.00 50.00 133.33 25.00 125.00 333.33 833.33 4.00 20.00 133.33
SOA = 1.2 MOA = .0

EMAD = .219 2 1
EMAL = .177 2 2
EMAL = .215 2 3
EMAD = .236 2 4
EMAD = .241 2 5
EMAD = .139 2 6
EMAD = .204 2 7
EMAL = .204 2 8
EMAD = .200 2 9
EMAD = .216 4 1
EMAD = .298 4 2
EMAL = .234 4 3
EMAD = .231 4 4
EMAL = .233 4 5
EMAD = .327 4 6
EMAD = .330 4 7
EMAD = .332 4 8
EMAD = .334 4 9
EMAL = .504 5 1
EMAD = .474 5 2
EMAD = .524 5 3
EMAD = .517 5 4
EMAL = .519 5 5
EMAD = .493 5 6
EMAD = .505 5 7
EMAD = .507 5 8
EMAD = .508 5 9
EMAL = .494 6 1
EMAL = .463 6 2
EMAD = .731 6 3
EMAD = .720 6 4
EMAD = .722 6 5
EMAD = .704 6 6
EMAD = .713 6 7
EMAL = .716 6 8
EMAL = .720 6 9
EMAL = .951 7 1
EMAL = .906 7 2

EMAD =	1.014	7	1
EMAD =	.988	7	4
EMAE =	.992	7	5
EMAL =	1.001	7	6
EMAD =	1.001	7	7
EMAL =	1.005	7	8
EMAE =	1.016	7	9
EMAD =	1.246	16	1
EMAE =	1.242	16	2
EMAD =	1.273	16	3
EMAE =	1.296	16	4
EMAD =	1.306	16	5
EMAD =	1.117	16	6
EMAE =	1.241	16	7
EMAD =	1.240	16	8
EMAL =	1.229	16	9
EMAE =	2.019	17	1
EMAE =	1.729	17	2
EMAD =	1.833	17	3
EMAD =	1.859	17	4
EMAD =	1.894	17	5
EMAD =	1.772	17	6
EMAD =	1.707	17	7
EMAE =	1.713	17	8
EMAD =	1.687	17	9
EMAD =	1.840	18	1
EMAE =	1.796	18	2
EMAE =	1.887	18	3
EMAL =	1.766	18	4
EMAE =	1.870	18	5
EMAD =	1.863	18	6
EMAE =	1.869	18	7
EMAD =	1.877	18	8
EMAL =	1.884	18	9
EMAD =	2.024	19	1
EMAD =	1.983	19	2
EMAD =	2.067	19	3
EMAD =	2.048	19	4
EMAD =	2.052	19	5
EMAE =	2.045	19	6
EMAE =	2.051	19	7
EMAE =	2.058	19	8
EMAE =	2.064	19	9
EMAD =	2.152	20	1
EMAD =	2.126	20	2
EMAL =	2.179	20	3
EMAE =	2.167	20	4
EMAE =	2.169	20	5
EMAD =	2.165	20	6
EMAE =	2.169	20	7
EMAD =	2.172	20	8
EMAL =	2.177	20	9

	VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP: .0(F)	.820/	.050/	.030/	.020/	.020/	.000
REGION: 49-STATE	5.0/ 5.0/ 5.0 MPH (5.0)			.0/	.0/	.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.50	94.99	8.19	29.24	17.27
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	158.82	199.72	260.11	762.76	76.55	102.56	200.74
EXHAUST NOX:	2.50	2.56	4.65	9.37	32.37	.14	3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.25	.24	.24	.03	1.04	.01	.29

CAL. YEAR: 1977 VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
5.0/ 5.0/ 5.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.50	94.99	8.19	29.24	15.49.
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	158.82	199.72	260.11	762.76	76.55	102.56	188.82
EXHAUST NOX:	2.50	2.56	4.65	9.37	32.37	.14	2.50

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.25	.24	.24	.03	1.04	.01	.26

ACCELERATION EMISSIONS FOR INTERSECTION 1 PHASE 1 APPROACH Z = .2314+01 GM/VEHICLE

CAL. YEAR: 1977 VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE TEMP: .0(F) .820/ .050/ .030/ .020/ .020/ .000
25.0/25.0/25.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.26	5.91	8.36	22.01	3.77	8.93	5.69
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	38.71	42.16	51.56	211.97	24.05	25.98	42.44
EXHAUST NOX:	2.97	2.96	5.15	11.21	19.18	.12	3.49

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.25	.24	.24	.03	1.04	.01	.29

CAL. YEAR: 1977 VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
25.0/25.0/25.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.26	5.91	8.36	22.01	3.77	8.93	5.26
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	38.71	42.16	51.56	211.97	24.05	25.98	38.71
EXHAUST NOX:	2.97	2.96	5.15	11.21	19.18	.12	2.93

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66

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IDLE  CO:  25.17    26.79    37.67    42.93      .93     8.96     25.17
IDLE  NOX:   .25      .24      .24      .03     1.04      .01       .28
-----------------------------------------------------------------------------
CRUISE EMISSIONS FOR INTERSECTION    1 PHASE    1 APPROACH    2 =        .2007+00 GM/VEHICLE/SEC
   X(I) =    10.00 -100.00  -20.00  200.00 1333.33   40.00 -400.00-2666.67 5333.33   10.00 -100.00 1333.33
   SOA =   1.0          HOA =    .0
        EMAD =          .545    2    1
        EMAD =          .737    2    2
        EMAD =          .261    2    3
        EMAD =          .176    2    4
        EMAD =          .227    2    5
        EMAD =          .062    2    6
        EMAD =          .274    2    7
        EMAD =          .271    2    8
        EMAD =          .240    2    9
        EMAD =          .530    4    1
        EMAD =          .445    4    2
        EMAD =          .373    4    3
        EMAD =          .385    4    4
        EMAD =          .402    4    5
        EMAD =          .386    4    6
        EMAD =          .409    4    7
        EMAD =          .393    4    8
        EMAD =          .404    4    9
        EMAD =          .829    5    1
        EMAD =          .680    5    2
        EMAD =          .579    5    3
        EMAD =          .610    5    4
        EMAD =          .636    5    5
        EMAD =          .594    5    6
        EMAD =          .633    5    7
        EMAD =          .616    5    8
        EMAD =          .622    5    9
        EMAD =         1.086    6    1
        EMAD =          .931    6    2
        EMAD =          .794    6    3
        EMAD =          .841    6    4
        EMAD =          .866    6    5
        EMAD =          .845    6    6
        EMAD =          .855    6    7
        EMAD =          .829    6    8
        EMAD =          .853    6    9
        EMAD =         1.431    7    1
        EMAD =         1.209    7    2
        EMAD =          .994    7    3
        EMAD =         1.097    7    4
        EMAD =         1.136    7    5
        EMAD =         1.150    7    6
        EMAD =         1.151    7    7
        EMAD =         1.094    7    8
        EMAD =         1.140    7    9
        EMAD =         1.966   16    1
        EMAD =         1.447   16    2
        EMAD =         1.385   16    3
        EMAD =         1.300   16    4
        EMAD =         1.422   16    5
        EMAD =         1.119   16    6
```

EMAD =	1.517	16	7
EMAD =	1.524	16	8
EMAD =	1.451	16	9
EMAD =	3.426	17	1
EMAD =	1.978	17	2
EMAD =	1.771	17	3
EMAD =	1.666	17	4
EMAD =	2.007	17	5
EMAD =	1.172	17	6
EMAD =	2.244	17	7
EMAD =	2.192	17	8
EMAD =	2.024	17	9
EMAD =	2.407	18	1
EMAD =	2.184	18	2
EMAD =	2.301	18	3
EMAD =	2.084	18	4
EMAD =	2.124	18	5
EMAD =	2.113	18	6
EMAD =	2.133	18	7
EMAD =	2.074	18	8
EMAD =	2.120	18	9
EMAD =	2.470	19	1
EMAD =	2.266	19	2
EMAD =	2.099	19	3
EMAD =	2.175	19	4
EMAD =	2.211	19	5
EMAD =	2.201	19	6
EMAD =	2.219	19	7
EMAD =	2.165	19	8
EMAD =	2.207	19	9
EMAD =	2.426	20	1
EMAD =	2.298	20	2
EMAD =	2.194	20	3
EMAD =	2.241	20	4
EMAD =	2.264	20	5
EMAD =	2.258	20	6
EMAD =	2.269	20	7
EMAD =	2.235	20	8
EMAD =	2.262	20	9

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VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
.880/ .050/ .030/ .020/ .020/ .000
.0/ .0/ .0

CAL. YEAR: 1977 TEMP: .0(F)
REGION: 49-STATE 10.0/10.0/10.0 MPH (5.0)

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	9.01	10.16	13.85	59.23	6.51	16.42	10.17
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	91.91	95.18	125.05	509.02	53.96	54.09	100.80
EXHAUST NOX:	2.47	2.48	4.20	9.83	26.79	.12	3.12

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.29

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
1.000/ .000/ .000/ .000/ .000/ .000

CAL. YEAR: 1977 TEMP: 75.0(F)

REGION: 49-STATE 10.0/10.0/10.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	9.01	10.16	13.05	5[illegible].23	6.51	16.42	9.01
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	91.91	91.16	125.05	509.02	53.96	54.09	91.91
EXHAUST NOX:	2.43	2.40	4.20	9.83	26.79	.12	2.43

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

DECELERATION EMISSIONS FOR INTERSECTION 1 PHASE 2 APPROACH 1 = .2480+01 GM/VEHICLE

X(I) = 5.00 25.00 10.00 50.00 166.67 20.00 100.00 333.33 666.67 5.00 25.00 166.67

SOA = 1.0 HOA = .0

EMAD =	.274	2	1
EMAD =	.221	2	2
EMAD =	.259	2	3
EMAD =	.280	2	4
EMAD =	.287	2	5
EMAD =	.204	2	6
EMAD =	.257	2	7
EMAD =	.257	2	8
EMAD =	.253	2	9
EMAD =	.398	4	1
EMAD =	.377	4	2
EMAD =	.413	4	3
EMAD =	.410	4	4
EMAD =	.412	4	5
EMAD =	.404	4	6
EMAD =	.410	4	7
EMAD =	.412	4	8
EMAD =	.413	4	9
EMAD =	.625	5	1
EMAD =	.588	5	2
EMAD =	.638	5	3
EMAD =	.631	5	4
EMAD =	.634	5	5
EMAD =	.613	5	6
EMAD =	.623	5	7
EMAD =	.625	5	8
EMAD =	.626	5	9
EMAD =	.857	6	1
EMAD =	.819	6	2
EMAD =	.887	6	3
EMAD =	.876	6	4
EMAD =	.879	6	5
EMAD =	.869	6	6
EMAD =	.871	6	7
EMAD =	.875	6	8
EMAD =	.879	6	9
EMAD =	1.166	7	1
EMAD =	1.111	7	2
EMAD =	1.212	7	3
EMAD =	1.192	7	4

EMAD =	1.197	7	5
EMAD =	1.204	7	6
EMAD =	1.205	7	7
EMAD =	1.212	7	8
EMAD =	1.218	7	9
EMAD =	1.631	16	1
EMAD =	1.501	16	2
EMAD =	1.532	16	3
EMAD =	1.553	16	4
EMAD =	1.568	16	5
EMAD =	1.417	16	6
EMAD =	1.516	16	7
EMAD =	1.515	16	8
EMAD =	1.506	16	9
EMAD =	2.494	17	1
EMAD =	2.132	17	2
EMAD =	2.235	17	3
EMAD =	2.262	17	4
EMAD =	2.304	17	5
EMAD =	1.387	17	6
EMAD =	2.155	17	7
EMAD =	2.161	17	8
EMAD =	2.140	17	9
EMAD =	2.332	18	1
EMAD =	2.276	18	2
EMAD =	2.367	18	3
EMAD =	2.347	18	4
EMAD =	2.352	18	5
EMAD =	2.346	18	6
EMAD =	2.351	18	7
EMAD =	2.358	18	8
EMAD =	2.364	18	9
EMAD =	2.539	19	1
EMAD =	2.488	19	2
EMAD =	2.572	19	3
EMAD =	2.553	19	4
EMAD =	2.557	19	5
EMAD =	2.552	19	6
EMAD =	2.557	19	7
EMAD =	2.564	19	8
EMAD =	2.569	19	9
EMAD =	2.679	20	1
EMAD =	2.647	20	2
EMAD =	2.699	20	3
EMAD =	2.687	20	4
EMAD =	2.690	20	5
EMAD =	2.687	20	6
EMAD =	2.690	20	7
EMAD =	2.694	20	8
EMAD =	2.697	20	9

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP:	.0(F)	.880/	.050/	.030/	.020/	.020/	.000
REGION: 49-STATE	5.0/ 5.0/ 5.0 MPH (5.0)				.0/	.0/	.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.50	94.99	8.19	29.24	17.27

*EVAP HC:	2.02	2.24	3.10	2.92	.00	1.94	----
EXHAUST CO:	188.82	199.72	260.11	762.76	76.55	102.56	200.74
EXHAUST NOX:	2.50	2.58	4.09	9.37	32.37	.14	3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.29	.24	.44	.03	1.04	.01	.29

CAL. YEAR: 1977 VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
5.0/ 5.0/ 5.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.50	94.99	8.19	29.24	15.49
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	188.82	199.72	260.11	762.76	76.55	102.56	188.82
EXHAUST NOX:	2.50	2.58	4.09	9.37	32.37	.14	2.50

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.29	.24	.44	.03	1.04	.01	.28

ACCELERATION EMISSIONS FOR INTERSECTION 1 PHASE 2 APPROACH 1 = .2P67+01 GM/VEHICLE

CAL. YEAR: 1977 VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE TEMP: .0(F) .680/ .050/ .030/ .020/ .020/ .000
20.0/20.0/20.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	6.45
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.98	268.72	30.27	30.45	52.23
EXHAUST NOX:	2.72	2.75	4.09	10.75	20.62	.12	3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.29	.24	.44	.03	1.04	.01	.29

CAL. YEAR: 1977 VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
20.0/20.0/20.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	5.88
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.98	268.72	30.27	30.45	47.49
EXHAUST NOX:	2.72	2.75	4.09	10.75	20.62	.12	2.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.29	.24	.44	.03	1.04	.01	.28

CRUISE EMISSIONS FOR INTERSECTION 1 PHASE 2 APPROACH 1 = .2116+00 GM/VEHICLE/SEC

X(I) = 10.00 -100.00 -20.00 200.00 1333.33 40.00 -400.00-2666.67 5333.33 10.00 -100.00 1333.33

DOA = 1.0 HOA = .0

EMAL =	.548	2	1
EMAD =	.337	2	2
EMAD =	.261	2	3
EMAL =	.176	2	4
EMAD =	.227	2	5
EMAD =	.062	2	6
EMAL =	.274	2	7
EMAD =	.271	2	8
EMAD =	.240	2	9
EMAL =	.530	4	1
EMAD =	.445	4	2
EMAD =	.373	4	3
EMAL =	.385	4	4
EMAD =	.402	4	5
EMAL =	.336	4	6
EMAD =	.409	4	7
EMAL =	.393	4	8
EMAD =	.404	4	9
EMAD =	.929	5	1
EMAL =	.680	5	2
EMAD =	.579	5	3
EMAL =	.610	5	4
EMAL =	.636	5	5
EMAD =	.594	5	6
EMAL =	.633	5	7
EMAL =	.616	5	8
EMAL =	.622	5	9
EMAD =	1.086	6	1
EMAD =	.931	6	2
EMAD =	.794	6	3
EMAL =	.641	6	4
EMAL =	.766	6	5
EMAD =	.845	6	6
EMAL =	.855	6	7
EMAL =	.829	6	8
EMAL =	.853	6	9
EMAD =	1.431	7	1
EMAL =	1.209	7	2
EMAD =	.994	7	3
EMAL =	1.097	7	4
EMAD =	1.136	7	5
EMAL =	1.150	7	6
EMAD =	1.151	7	7
EMAD =	1.094	7	8
EMAD =	1.140	7	9
EMAD =	1.966	16	1
EMAD =	1.447	16	2
EMAL =	1.788	16	3
EMAL =	1.700	16	4
EMAD =	1.422	16	5
EMAD =	1.119	16	6
EMAD =	1.517	16	7
EMAL =	1.624	16	8

EMAD =	1.451	16	9
EMAD =	3.426	17	1
EMAD =	1.775	17	2
EMAD =	1.771	17	3
EMAD =	1.666	17	4
EMAD =	2.007	17	5
EMAD =	1.172	17	6
EMAD =	2.244	17	7
EMAD =	2.192	17	8
EMAD =	2.224	17	9
EMAD =	2.407	18	1
EMAD =	2.184	18	2
EMAD =	2.001	18	3
EMAD =	2.084	18	4
EMAD =	2.124	18	5
EMAD =	2.113	18	6
EMAD =	2.133	18	7
EMAD =	2.074	18	8
EMAD =	2.120	18	9
EMAD =	2.470	19	1
EMAD =	2.266	19	2
EMAD =	2.099	19	3
EMAD =	2.175	19	4
EMAD =	2.211	19	5
EMAD =	2.201	19	6
EMAD =	2.219	19	7
EMAD =	2.165	19	8
EMAD =	2.207	19	9
EMAD =	2.426	20	1
EMAD =	2.298	20	2
EMAD =	2.194	20	3
EMAD =	2.241	20	4
EMAD =	2.264	20	5
EMAD =	2.258	20	6
EMAD =	2.269	20	7
EMAD =	2.235	20	8
EMAD =	2.262	20	9

CAL. YEAR: 1977 TEMP: .0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 10.0/10.0/10.0 MPH (5.0) .880/ .050/ .030/ .020/ .020/ .000
.0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	9.01	10.16	13.25	59.23	6.51	16.42	10.17
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	91.91	98.18	125.05	509.02	53.96	54.09	100.80
EXHAUST NOX:	2.43	2.48	4.20	9.83	26.79	.12	3.12

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.25	.24	.24	.03	1.04	.01	.29

CAL. YEAR: 1977 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 10.0/10.0/10.0 MPH (5.0) 1.000/ .000/ .000/ .000/ .000/ .000
.0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	9.01	10.1(	12.6[illegible]	59.23	6.51	16.42	9.01
EVAP HC:	2.02	2.22	3.1(	2.92	.00	1.94	----
EXHAUST CO:	91.91	99.1(	125.05	509.02	53.96	54.09	91.91
EXHAUST NOX:	2.43	2.46	4.2(	9.83	26.79	.12	2.43

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	28.24	37.67	42.93	.93	9.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

DECELERATION EMISSIONS FOR INTERSECTION 1 PHASE 2 APPROACH 2 = [illegible].2480+01 GM/VEHICLE

V(I) = 5.00 25.00 10.00 50.00 166.67 20.00 100.00 333.33 666.67 5.00 25.00 166.67

SOA = 1.(BOA = .0

EMAD =	.274	2	1
EMAD =	.221	2	2
EMAD =	.259	2	3
EMAD =	.280	2	4
EMAD =	.287	2	5
EMAD =	.204	2	6
EMAD =	.257	2	7
EMAD =	.257	2	8
EMAD =	.253	2	9
EMAD =	.398	4	1
EMAD =	.377	4	2
EMAD =	.413	4	3
EMAD =	.410	4	4
EMAD =	.412	4	5
EMAD =	.404	4	6
EMAD =	.410	4	7
EMAD =	.412	4	8
EMAD =	.413	4	9
EMAD =	.625	5	1
EMAD =	.588	5	2
EMAD =	.638	5	3
EMAD =	.631	5	4
EMAD =	.634	5	5
EMAD =	.613	5	6
EMAD =	.623	5	7
EMAD =	.625	5	8
EMAD =	.626	5	9
EMAD =	.857	6	1
EMAD =	.819	6	2
EMAD =	.887	6	3
EMAD =	.876	6	4
EMAD =	.879	6	5
EMAD =	.869	6	6
EMAD =	.871	6	7
EMAD =	.875	6	8
EMAD =	.879	6	9
EMAD =	1.166	7	1
EMAD =	1.111	7	2
EMAD =	1.211	7	3
EMAD =	1.192	7	4
EMAD =	1.197	7	5
EMAD =	1.204	7	6

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EMAD =	1.205	7	7
EMAD =	1.212	7	8
EMAD =	1.215	7	9
EMAD =	1.631	16	1
EMAD =	1.501	16	2
EMAD =	1.532	16	3
EMAD =	1.553	16	4
EMAD =	1.561	16	5
EMAD =	1.417	16	6
EMAD =	1.516	16	7
EMAD =	1.515	16	8
EMAD =	1.506	16	9
EMAD =	2.494	17	1
EMAD =	2.132	17	2
EMAD =	2.235	17	3
EMAD =	2.262	17	4
EMAD =	2.304	17	5
EMAD =	1.687	17	6
EMAD =	2.155	17	7
EMAD =	2.161	17	8
EMAD =	2.140	17	9
EMAD =	2.332	18	1
EMAD =	2.276	18	2
EMAD =	2.367	18	3
EMAD =	2.347	18	4
EMAD =	2.352	18	5
EMAD =	2.346	18	6
EMAD =	2.351	18	7
EMAD =	2.358	18	8
EMAD =	2.364	18	9
EMAD =	2.539	19	1
EMAD =	2.488	19	2
EMAD =	2.572	19	3
EMAD =	2.553	19	4
EMAD =	2.557	19	5
EMAD =	2.552	19	6
EMAD =	2.557	19	7
EMAD =	2.564	19	8
EMAD =	2.569	19	9
EMAD =	2.679	20	1
EMAD =	2.647	20	2
EMAD =	2.699	20	3
EMAD =	2.687	20	4
EMAD =	2.690	20	5
EMAD =	2.687	20	6
EMAD =	2.690	20	7
EMAD =	2.694	20	8
EMAD =	2.697	20	9

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP:	.0(F)	.880/	.050/	.030/	.020/	.020/	.000
REGION: 49-STATE	5.0/ 5.0/ 5.0 MPH (5.0)				.0/	.0/	.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.50	94.99	8.19	29.24	17.27
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	188.82	199.72	260.11	762.76	76.55	102.56	200.74

EXHAUST NOX: 2.50 2.56 4.65 9.37 32.37 .14 3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.25	.24	.24	.03	1.04	.01	.29

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977 TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000

REGION: 49-STATE 5.0/ 5.0/ 5.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.67	23.52	94.99	8.19	29.24	15.49
*EVAP HC:	2.02	2.22	3.40	2.92	.00	1.94	----
EXHAUST CO:	188.82	199.72	260.91	762.76	76.55	102.56	188.82
EXHAUST NOX:	2.50	2.56	4.65	9.37	32.37	.14	2.50

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.25	.24	.24	.03	1.04	.01	.28

ACCELERATION EMISSIONS FOR INTERSECTION 1 PHASE 2 APPROACH 2 = .2867+01 GM/VEHICLE

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977 TEMP: .0(F) .880/ .050/ .030/ .020/ .020/ .000

REGION: 49-STATE 20.0/20.0/20.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.89	6.62	9.24	28.76	4.42	10.10	6.45
*EVAP HC:	2.02	2.22	3.40	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	69.98	268.72	30.27	30.45	52.23
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.25	.24	.24	.03	1.04	.01	.29

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977 TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000

REGION: 49-STATE 20.0/20.0/20.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.89	6.62	9.24	28.76	4.42	10.10	5.88
*EVAP HC:	2.02	2.22	3.40	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	69.98	268.72	30.27	30.45	47.49
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	2.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.25	.24	.24	.03	1.04	.01	.28

CRUISE EMISSIONS FOR INTERSECTION 1 PHASE 2 APPROACH 2 = .2116+00 GM/VEHICLE/SEC

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                                VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1977          TEMP:   .0(F)          .880/ .050/ .030/ .020/ .020/ .000
REGION: 49-STATE         20.0/20.0/20.0 MPH ( 5.0)          .0/    .0/    .0

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                  LDV      LDT1     LDT2      HDG      HDD       MC      ALL MODES
   TOTAL HC:     5.88      6.62     9.24     28.76     4.42     10.10       6.45
   *EVAP HC:     2.02      2.22     3.10      2.92      .00      1.94       ----
EXHAUST  CO:    47.49     51.42    62.98    266.72    30.27    30.45      52.23
EXHAUST NOX:     2.72      2.75     4.69     10.75    20.62      .12       3.30

                        CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:     1.66      1.94     3.52      4.05      .44     4.25       1.75
   IDLE  CO:    25.17     26.29    37.67     42.93      .93     8.96      25.47
   IDLE NOX:     .28       .24      .24       .03     1.04      .01        .29
-------------------------------------------------------------------------------
                                VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1977          TEMP: 75.0(F)         1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE         20.0/20.0/20.0 MPH ( 5.0)          .0/    .0/    .0

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                  LDV      LDT1     LDT2      HDG      HDD       MC      ALL MODES
   TOTAL HC:     5.89      6.62     9.24     28.76     4.42     10.10       5.88
   *EVAP HC:     2.02      2.22     3.10      2.92      .00      1.94       ----
EXHAUST  CO:    47.49     51.42    62.98    266.72    30.27    30.45      47.49
EXHAUST NOX:     2.72      2.75     4.69     10.75    20.62      .12       2.72

                        CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:     1.66      1.94     3.52      4.05      .44     4.25       1.66
   IDLE  CO:    25.17     26.29    37.67     42.93      .93     8.96      25.17
   IDLE NOX:     .28       .24      .24       .03     1.04      .01        .28
-------------------------------------------------------------------------------
FOR LINK    5 (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE=      .2116+00 GM/VEHICLE/SEC
                                VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1977          TEMP:   .0(F)          .880/ .050/ .030/ .020/ .020/ .000
REGION: 49-STATE         25.0/25.0/25.0 MPH ( 5.0)          .0/    .0/    .0

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                  LDV      LDT1     LDT2      HDG      HDD       MC      ALL MODES
   TOTAL HC:     5.26      5.91     8.26     22.01     3.77     8.93       5.69
   *EVAP HC:     2.02      2.22     3.10      2.92      .00     1.94       ----
EXHAUST  CO:    38.71     42.16    51.56    211.97    24.05    25.98      42.44
EXHAUST NOX:     2.93      2.96     5.18     11.21    19.18      .12       3.49

                        CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:     1.66      1.94     3.52      4.05      .44     4.25       1.75
   IDLE  CO:    25.17     26.29    37.67     42.93      .93     8.96      25.47
   IDLE NOX:     .28       .24      .24       .03     1.04      .01        .29
-------------------------------------------------------------------------------
                                VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1977          TEMP: 75.0(F)         1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE         25.0/25.0/25.0 MPH ( 5.0)          .0/    .0/    .0

                        COMPOSITE EMISSION FACTORS (GM/MILE)
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	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.26	5.91	5.38	22.01	3.77	3.93	5.26
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	36.71	42.14	51.58	211.97	24.05	25.98	38.71
EXHAUST NOX:	2.93	2.96	5.15	11.21	19.19	.12	2.93

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.29	.24	.24	.03	1.04	.01	.28

FOR LINK * (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE= .2007+00 GM/VEHICLE/SEC

CAL. YEAR: 1977
REGION: 49-STATE

TEMP: .F(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
20.0/20.0/20.0 MPH (5.0) .880/ .050/ .030/ .020/ .020/ .000
.0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	6.45
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.95	268.72	30.27	30.45	52.23
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.29	.24	.24	.03	1.04	.01	.29

CAL. YEAR: 1977
REGION: 49-STATE

TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
20.0/20.0/20.0 MPH (5.0) 1.000/ .000/ .000/ .000/ .000/ .000
.0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	5.88
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.95	268.72	30.27	30.45	47.49
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	2.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.29	.24	.24	.03	1.04	.01	.28

FOR LINK * (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE= .2116+00 GM/VEHICLE/SEC

CAL. YEAR: 1977
REGION: 49-STATE

TEMP: .F(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
20.0/20.0/20.0 MPH (5.0) .880/ .050/ .030/ .020/ .020/ .000
.0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	6.45
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.95	268.72	30.27	30.45	52.23
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	6.45
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.58	268.72	30.27	30.45	52.23
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.29	.24	.24	.03	1.04	.01	.28

FOR LINK 6 (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE= .2007+00 GM/VEHICLE/SEC

CAL. YEAR: 1977 TEMP: 70.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 20.0/20.0/20.0 MPH (5.0) .880/ .050/ .030/ .020/ .020/ .000
.0/ .0/ .0

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	6.45
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.58	268.72	30.27	30.45	52.23
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.29	.24	.24	.03	1.04	.01	.29

CAL. YEAR: 1977 TEMP: 70.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 20.0/20.0/20.0 MPH (5.0) 1.000/ .000/ .000/ .000/ .000/ .000
.0/ .0/ .0

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	5.88
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.58	268.72	30.27	30.45	47.49
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	2.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.29	.24	.24	.03	1.04	.01	.28

FOR LINK 7 (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE= .2116+00 GM/VEHICLE/SEC

CAL. YEAR: 1977 TEMP: 70.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 20.0/20.0/20.0 MPH (5.0) .880/ .050/ .030/ .020/ .020/ .000
.0/ .0/ .0

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	6.45
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.58	268.72	30.27	30.45	52.23
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

```
IDLE  HC:   1.66     1.94     3.52     4.05      .44     4.25     1.75
IDLE  CO:  25.17    26.29    37.67    42.93      .93     8.96    25.47
IDLE NOX:    .28      .24      .24      .03     1.04      .01      .29
-----------------------------------------------------------------------
CAL. YEAR: 1977          VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
REGION: 49-STATE  TEMP: 75.0(F)     1.000/ .000/ .000/ .000/ .000/ .000
                  20.0/20.0/20.0 MPH ( 5.0)          .0/   .0/   .0

                  COMPOSITE EMISSION FACTORS (GM/MILE)
              LDV     LDT1     LDT2     HDG     HDD      MC     ALL MODES
TOTAL HC:    5.89     6.62     9.24    28.76    4.42    10.10     5.88
*EVAP HC:    2.02     2.22     3.10     2.92     .00     1.94     ----
EXHAUST CO:  47.49    51.42    62.95   268.72   30.27    30.45    47.49
EXHAUST NOX:  2.72     2.75     4.69    10.75   20.62      .12     2.72

                  CORRECTED IDLE EMISSION FACTORS (GM/MIN)
IDLE  HC:   1.66     1.94     3.52     4.05      .44     4.25     1.66
IDLE  CO:  25.17    26.29    37.67    42.93      .93     8.96    25.17.
IDLE NOX:    .28      .24      .24      .03     1.04      .01      .28
-----------------------------------------------------------------------
FOR LINK      (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE=      .2116+00 GM/VEHICLE/SEC
I=    1 J=    1 INS=    1 VOL=      .1000+03 CS=      .2100+04 ISIG=    1
QLENTH=       .6509+01 DELAY=      .9419+01 NPHASE=    2
GAP=        .0 LINK=    1 NGND=    0 CY=     26.47 G=      6.62
I=    2 J=    1 INS=    1 VOL=      .8000+02 CS=      .1800+04 ISIG=    1
QLENTH=       .5419+01 DELAY=      .9509+01 NPHASE=    2
GAP=        .0 LINK=    2 NGND=    0 CY=     26.47 G=      6.62
I=    1 J=    2 INS=    1 VOL=      .1000+03 CS=      .1200+04 ISIG=    1
QLENTH=       .4577+01 DELAY=      .4372+01 NPHASE=    2
GAP=        .0 LINK=    3 NGND=    0 CY=     26.47 G=     13.84
I=    2 J=    2 INS=    1 VOL=      .1000+03 CS=      .1200+04 ISIG=    1
QLENTH=       .4577+01 DELAY=      .4372+01 NPHASE=    2
GAP=        .0 LINK=    4 NGND=    0 CY=     26.47 G=     13.84


INTERSECTION=    1 PHASE=    1 APPROACH=    1 LINK=    1 LANE=    1
EMISSION RATE=       .4987-03 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    1 LINK(PSEUDOLINK)=    9 LANE=    1
EMISSION RATE=       .1718-02 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    1 LINK=    1 LANE=    2
EMISSION RATE=       .4987-03 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    1 LINK(PSEUDOLINK)=    9 LANE=    2
EMISSION RATE=       .1718-02 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    2 LINK=    2 LANE=    1
EMISSION RATE=       .3990-03 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    2 LINK(PSEUDOLINK)=   10 LANE=    1
EMISSION RATE=       .2494-01 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    2 LINK=    2 LANE=    2
EMISSION RATE=       .3990-03 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    2 LINK(PSEUDOLINK)=   10 LANE=    2
EMISSION RATE=       .2494-01 GM/METER/SEC
INTERSECTION=    1 PHASE=    2 APPROACH=    1 LINK=    3 LANE=    1
EMISSION RATE=       .6574-03 GM/METER/SEC
INTERSECTION=    1 PHASE=    2 APPROACH=    1 LINK(PSEUDOLINK)=   11 LANE=    1
EMISSION RATE=       .2264-02 GM/METER/SEC
INTERSECTION=    1 PHASE=    2 APPROACH=    2 LINK=    4 LANE=    1
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EMISSION RATE= .6574-02 GM/METER/SEC
INTERSECTION= 1 PHASE= 2 APPROACH= 2 LINK(PSEUDOLINK)= 12 LANE= 1
EMISSION RATE= .2254-02 GM/METER/SEC

LINK(NOT APPROACHING INTERSECTION)= 5 LANE= 1 EMISSION RATE= .5259-03 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)= 5 LANE= 2 EMISSION RATE= .5259-03 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)= 6 LANE= 1 EMISSION RATE= .4788-03 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)= 6 LANE= 2 EMISSION RATE= .3192-03 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)= 7 LANE= 1 EMISSION RATE= .7889-03 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)= 8 LANE= 1 EMISSION RATE= .7889-03 GM/METER/SEC

CONTRIBUTION FROM LINK 1

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	0.	.000
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 37.500 THETPP = -4.6
XLL = 42.500 THETPP = -5.0

CONTRIBUTION FROM LINK 2

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	0.	.000
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	159.	.139
1.4700	1.9800	1.0000	12.	.010

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 16.250 THETPP = -90.0
XLL = 23.750 THETPP = -26.6

CONTRIBUTION FROM LINK 3

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	0.	.000
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	67.	.075

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 70.000 THETPP = -1.7
XLL = 70.000 THETPP =

STREET CANYON RECEPTOR 4 HOUR = 2 CONCENTRATION = .575+02 LINK = 3 LANE = 1
YLL = 10.000 THETPP = .0
YLL = 10.000 THETPP =

STREET CANYON RECEPTOR 5 HOUR = 2 CONCENTRATION = .361+02 LINK = 3 LANE = 1

CONTRIBUTION FROM LINK 2

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	22.	.019
1.5200	1.9800	1.0000	99.	.086
1.5200	1.9800	4.0000	50.	.043
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	1.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 10.000 THETPP = -11.3
XLL = 70.000 THETPP = 71.0

CONTRIBUTION FROM LINK 3

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	103.	.089
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 13.125 THETPP = -2.2
YLL = 21.875 THETPP = -2.3

CONTRIBUTION FROM LINK 6

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	15.	.013
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	114.	.099
1.4700	1.9800	1.0000	43.	.372

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 35.125 THETPP = -90.0
YLL = 41.875 THETPP = -45.0

CONTRIBUTION FROM LINK 7

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *

1.4600	1.9700	1.0000	0.	.000
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	2.	.002

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 10.000 THETPP = -.6
XLL = 10.000 THETPP =

STREET CANYON RECEPTOR 4 HOUR = 2 CONCENTRATION = .183+03 LINK = 7 LANE = 1
XLL = 70.000 THETPP = 1.7
XLL = 70.000 THETPP =

STREET CANYON RECEPTOR 5 HOUR = 2 CONCENTRATION = .433+02 LINK = 7 LANE = 1

CONTRIBUTION FROM LINK 5

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4600	1.9700	1.0000	0.	.000
1.5200	1.9800	1.0000	164.	.142
1.5200	1.9800	4.0000	34.	.030
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 30.000 THETPP = -31.0
XLL = 10.000 THETPP = 11.3

CONTRIBUTION FROM LINK 9

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4600	1.9700	1.0000	1.	.001
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 37.500 THETPP = -13.1
XLL = 42.500 THETPP = -16.9

CONTRIBUTION FROM LINK 10

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4600	1.9700	1.0000	3.	.003
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	92.	.080
1.4700	1.9800	1.0000	404.	.352

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 16.250 THETPP = -40.0
XLL = 23.750 THETPP = -26.6

CONTRIBUTION FROM LINK 11

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	1.	.001
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	298.	.259

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 30.000 THETPP = -31.6
*R= 4 L= 11 XX= 1.470 YY= 2.020 X1= 1.421 Y1= 1.990 X2= 1.490 Y2= 1.990 IANS= 1
XLL = 70.000 THETPP =

STREET CANYON RECEPTOR 4 HOUR = 2 CONCENTRATION = .198+03 LINK = 11 LANE = 1
XLL = 10.000 THETPP = 11.6
*R= 5 L= 11 XX= 1.470 YY= 1.980 X1= 1.421 Y1= 1.990 X2= 1.480 Y2= 1.990 IANS= 1
XLL = 10.000 THETPP =

STREET CANYON RECEPTOR 5 HOUR = 2 CONCENTRATION = .124+03 LINK = 11 LANE = 1

CONTRIBUTION FROM LINK 12

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	77.	.067
1.5200	1.9800	1.0000	341.	.297
1.5200	1.9800	4.0000	171.	.149
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	2.	.002

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 10.000 THETPP = -11.3
XLL = 70.000 THETPP = 71.0

CONCENTRATION FOR HOUR 2 AT RECEPTOR 1 = .1931+00 PPM
CONCENTRATION FOR HOUR 2 AT RECEPTOR 2 = .5260+00 PPM
CONCENTRATION FOR HOUR 2 AT RECEPTOR 3 = .2222+00 PPM
CONCENTRATION FOR HOUR 2 AT RECEPTOR 4 = .6995+00 PPM
CONCENTRATION FOR HOUR 2 AT RECEPTOR 5 = .6173+00 PPM

NORMAL EXIT. EXECUTION TIME: 29652 MILLISECONDS.

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